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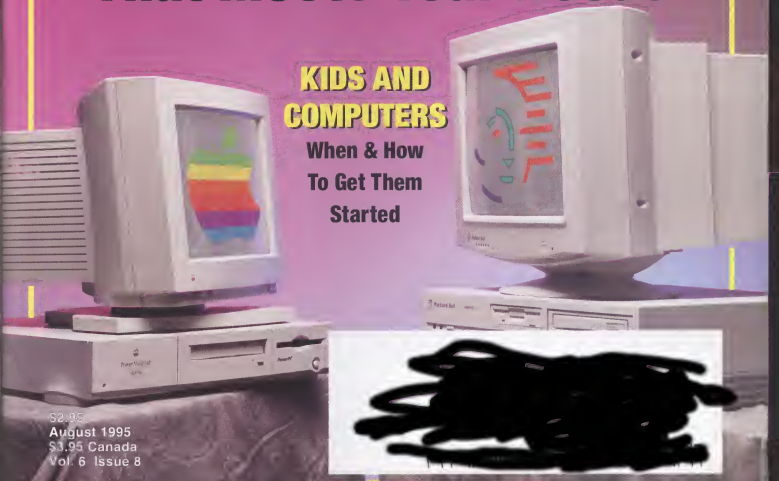

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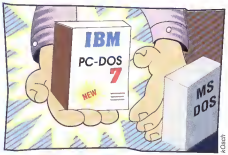

WINDOWS COMPUTING

FAMILY COMPUTING

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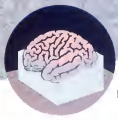
TECHNOLOGY NEWS

Compiled by Cindy Krushenisky

Computers On The Brain



What comes to mind when you think of a PC? A monitor, system unit, and keyboard? Computers of the future may not consist of hardware at all. Instead, imagine a squishy pound of DNA molecules floating in 1,000 quarts of fluid.

Although it may seem like some grotesque science fiction flick, computers may eventually come in all makes, sizes, and consistencies. Recently researchers have used DNA to create computers that are dramatically more powerful than current PCs and require less space to store information.

It started with a paper published early this year explaining how DNA could be used to compute advanced mathematic problems. Instead of representing data digitally as 0s and 1s that travel through electronic circuits, a genetic computer represents data in terms of chemical units of DNA that react in a test tube. Dr. Leonard Adlemen at the University of Southern California in Los Angeles put his theory into practice when he solved a standard mathematic problem with a test tube containing one-fiftieth of a teaspoon of DNA fluid, according to a recent report in *The New York Times*. Since then, other researchers have been collaborating to put Adlemen's theory into practice on a larger scope.

Although it's unlikely genetic computers will replace existing desktop systems anytime soon, one of the most exciting concepts is DNA's ability to compute "massively parallel." That means a system made up of trillions of DNA molecules would be powerful enough to do more calculating at one time than would be possible if all the computers now in the world were combined.

Telecommunicating With The Toaster

The days of the meterman may be numbered. Soon, utility companies may discover they don't need to send someone to read your meter and determine your energy consumption.

The Public Service Electric and Gas Company of New Jersey and AT&T successfully completed a demonstration of a system that would allow access to that kind of information via a telecommunications link. The demonstration consisted of 10 PSE&G customers in Moorestown, N.J., and used special fiber/coaxial cables to connect the sites.

Called the AT&T Integrated Broadband Utility Solution, the system replaced existing utility meters with software and hardware. Along with remote meter reading and the ability to automatically connect and disconnect service, the system allowed monitoring of power used by individual appliances and on/off control of appliances.

It's too early to tell if all meter personnel will be turning in their clipboards. The system will be tried further in a pilot program of 1,000 customers late this year. If all goes well, PSE&G will expand its installation to more than 10,000 sites by the end of 1996 and then to 500,000 by 2001. AT&T also plans to market the system to other utilities around the country.

Along the same line, TECO Energy of Tampa, Fla., and IBM are working on a pilot program that would be of more use to average consumers much sooner. The program is testing an energy management and communications system that lets customers track and control their energy use, right down to the toaster. They even can do it over the phone or through wireless technology.

The system would be made up of software available off the shelf, a home computer, and an extra processor (called Shubox) attached to the electric meter outside the house.

TECO has tested prototype units in Tampa for the past two years and hopes to complete an agreement with IBM to roll out the technology commercially to its customers by the end of the year.

Safety On The Superhighway

The ability to share data and access information is a key attraction of the Information Superhighway. But one pothole the highway keeps bumping over is the security of that data. Who wants to purchase anything with their credit card or bank account information if there's a possibility someone else can access it? And what bank in its right mind would want to give people access to their account information without ensuring that that's all they can access in the bank's computers?

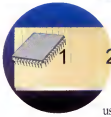
So far, a couple of companies have developed transaction security standards: Secure HTTP from Enterprise Integration Technologies and SSL from Netscape. Unfortunately, neither is widespread and they were not able to communicate with each other.

To make it easier for information providers to secure information on the Internet, there must be a universal approach to security. One company, Terisa Systems, is trying to patch the problem by combining the two leading security standards.

Its chances of creating a universal standard are good. Three leading online services (America Online, CompuServe, and Prodigy) and the two existing security standard companies have indicated in one way or another that they will support or adopt a new standard by Terisa.

And it may not be long until we are banking and buying on the Internet. Terisa plans to introduce its new standard to program developers in mid-1995, while end-users should expect to see commercial products based on the new technology by the third quarter of 1995.

It's A Small, Electronic World



While the world may not actually be getting smaller, the electronics that run the world certainly are. But imagine having to design and put together those tiny microchips and circuits.

Electrical engineers may soon be forced to use three-dimensional "virtual reality" to design future generations of our miniature electronics, according to Robert W. Dutton, professor of electrical engineering and chief scientist at Stanford's Center for Integrated Systems. Two-dimensional simulations currently employed (for example, those used to illustrate individual transistors and other electronic elements) are no longer practical because components have shrunk so dramatically and because of the types of technologies that are being incorporated into the devices.

Dutton says the new three-dimensional technology will be complicated—even more so than the computer graphics created for Hollywood. But what can you expect? It takes complicated technology to create even more complicated hardware to operate it. ●

VCRs Go Digital

If eventually you make the switch to digital television for its high-quality images and sound, either through a satellite receiver (such as RCA's DSS receiver) or your regular cable supplier, you will want to be able to record your favorite soap, sporting event, or movie, right? Fortunately, the communications industry is a step ahead of you.

JVC (Victor Company of Japan, Ltd.) recently introduced a new digital standard based on the standard VHS technology, called D-VHS. The standard allows manufacturers to develop VCRs using **bitstream recording**, which is a method of recording and playing compressed signals on a tape as digital data.

Already Thomson Consumer Electronics and Hitachi have demonstrated a prototype VCR using D-VHS. It is scheduled to be introduced in the United States in the middle of 1996. It will work with digital signals, such as those used by digital broadcasters like DIRECTV and USSB, and is compatible with ordinary VHS tapes already in use. ●

Tuning In

We keep hearing that it won't be long until the Information Superhighway comes to our televisions. Now one online service is bringing television to the Information Superhighway.

CompuServe's Future Technologies Division is working on the *CompuServe Viewer*, which would allow users to see video images through its online service by late 1995. The video is enhanced by a chat feature that lets users talk simultaneously.

If you want to view TV on your PC, it usually requires a special circuit board that you plug into your computer to receive television signals. The CompuServe Viewer simply requires a 486 PC with Windows and at least a 9600bps modem. This simplicity, however, severely compromises the quality, making it a far cry from actual "real-time" video. The video consists of still video images that are refreshed every 30 seconds. Closed-captioned text accompanies the video, although audio events such as dialogue or sound effects may be downloaded as files from time to time. ●

Science Fiction Or Science Fact

Remember the holographic image of Princess Leia telling Obi-Wan Kenobi he was her last hope in "Star Wars"? Once again, life may be following fiction, but not quite so dramatically.

The Department of Defense's Advanced Research Projects Agency is partially funding a project that would develop a type of holographic data storage. A company called Tamarack Storage Devices Inc. will lead the development of the Wave Guide Holographic Storage System over the next five years.

This form of optical data storage would save data as three-dimensional images inside a cube of special material. The hardware would have no moving parts, and data would be retrieved more quickly since the entire image is retrieved rather than one bit of digital computer code at a time.

While we won't be using the new means of holographic storage to plea for help or communicate with other users, it will be used to increase and speed up data retrieval, perhaps for military applications, video-on-demand servers, filmless cameras, tapeless camcorders, and high-performance disk drives. ●

Tech Shorts

Technology crooks beware. Insurance companies, officials from the electronics industry, and law enforcement have unveiled plans for a national foundation to fight high-tech crime called The Technology Theft Prevention Foundation. The Foundation will provide education and funding to help law enforcement to prevent some of the $8 billion worth of international black market business for the nearly untraceable hardware and chips. . . .

Looking for a job? The Information Superhighway has opened many new avenues for job hunters, but that's not the only way companies are recruiting electronically. Take, for example, the Prudential Insurance Company of America. College students can learn about the company's advanced management program through a CD-ROM at campus kiosks or on their personal computers. This way, students can review company information in the comfort of their dorm room, at a time that's convenient for them. . . .

Apple Computer, Compaq Computer, Hewlett-Packard, IBM, and Microsoft are ready to support a new high-capacity compact disc standard that would store about 10 to 15 times more information than today's CD-ROMs. Two incompatible formats have been proposed: Sony and Philips with the MultiMedia Compact Disc (MMCD) format and the Super Density (SD) format supported by a group of companies headed by Toshiba. These top five computer companies, however, don't plan to choose; they want the two to coordinate and present a single format, maybe a combination of the two formats, that will meet a number of set rules. So far, neither side has budged. ●

PRODUCT PREVIEWS

The Internet Jukebox

You've probably heard of video-on-demand, the ability to access the videos you want, when you want to see them. Seattle-based Progressive Networks (PN) has created a similar concept called audio-on-demand.

Instead of waiting 25 minutes to download a five-minute song or audio file before you can hear it, PN's RealAudio audio-on-demand lets you access and play sound clips immediately. It works somewhat like a standard video cassette player/recorder in which you can browse, select, and play back audio files.

While a number of Internet providers will produce audio entertainment using the system, RealAudio's first partners to use the system include the American Broadcasting Co. (ABC) and National Public Radio (NPR). ABC plans eventually to use the system to make audible news, sports, and entertainment programs available on the Internet, while NPR will make its programs available to listeners who may have been too busy to listen during the day.

The system, however, isn't as easy as pushing a button. It's made up of three components: the *RealAudio Player* for consumers, the *RealAudio Studio* for companies creating the content, and *RealAudio Server* for online services. The RealAudio Player was expected to be available for free in mid-1995 via the Internet at http://www.RealAudio.com. For more information, call (206) 447-0567.

The Super CyberMouse

Forget chasing your mouse across your desk. IPC Peripherals of Fremont, Calif., has a pointing device you wear on your finger.

The CyberMouse operates like an ordinary mouse, but it also has three-dimensional capabilities so you can move through and around objects on-screen. This creates all kinds of opportunities for three-dimensional software games, such as throwing horseshoes or swinging a golf club. All the company needs now are programs it can interact with in three dimensions.

The CyberMouse is actually a 1.8-inch-thick band (similar to a watch band) that has two buttons. Tiny beacons on the mouse transmit beams to sensors located on a one-inch receiver that wraps around the side of the monitor.

Initially, the CyberMouse will ship with a game called *Rings*, which is an electronic version of horseshoes. It's now available for a price of $99. For more information, call (510) 354-0800.

Taking Back The Desktop

Take a quick gander at your desktop. If it's anything like ours, it's buried under computer, monitor, keyboard, printer, fax machine, books, papers, folders, and so on. By the time you tally it all up, there's little room left to actually get down to work.

Here's an inventive idea that might help. Integrated Technology USA of Teaneck, N.J., has introduced the CompuPhone 2000 keyboard that has a numeric keypad that also functions as a phone.

Place calls straight from the numbers on the keyboard, use software included with the keyboard to auto-dial calls, or dial directly from the Windows Cardfile or other personal information manager (PIM) software. Using a simple headset with built-in microphone packaged with the system, you even can answer calls directly from your keyboard, allowing you to get rid of your phone entirely. There's also a phone jack to plug in your old handset or phone headset if you like.

For about $140, the CompuPhone 2000 is now available for Windows and DOS, although a Macintosh version should be available by the end of the year. For more information, call (201) 907-0200.

Get Where You're Going

Sony no longer has the inside track on car navigation systems. For months, Sony was one of the first companies to offer a car system with links to satellites that help you find where you are headed, as you travel there.

Now, Toshiba has entered the global positioning game with a portable multimedia car navigation system, called the NAV1000. Just like Sony's NVF-F160 in-vehicle mobile navigational system (800/342-5721), it uses CD-ROM software from Etak Inc. This software can plot your route on color maps, as well as search for attractions, restaurants, shopping, and lodgings along the way. Using a network of eight satellites orbiting the earth, the NAV1000 can pinpoint a vehicle's position and show its exact location, determining how long it's going to take to get to a driver's destination.

But the NAV1000 has one extra. When you aren't using it to find where you are going, you can use it as a CD player to listen to music CDs. In addition, there are audio/video mini-jacks to connect it to a CD-ROM-playing camcorder or other video player.

The NAV1000 will be released in October for a suggested retail price of almost $3,000 (about the same as Sony's system). Initially, software will be available only for California, although additional regions are expected in 1996. For more information, call (800) 631-3811 or (201) 628-8000.

The MultiPASS™ 1000 Document Processing System. It combines a laser-quality printer, a plain paper fax, a PC fax, a scanner, a personal copier and a telephone — all in one compact unit. MultiPASS Desktop Manager for Windows™ software is included to manage printing, faxing, scanning and telephone functions. Plus you can print and fax from the Windows applications you're using now. MultiPASS is everything you need next to your PC. Everything.

It's a Printer. The MultiPASS 1000 incorporates 360 x 360 dpi award-winning Bubble Jet™ technology. It has a front loading, adjustable 200-sheet letter/legal paper cassette. The easy-to-replace, self-cleaning BX-2 (BC-02) ink cartridge snaps into place. And the MultiPASS 1000 supports popular printer emulations from Canon, IBM® and EPSON.®

It's a Plain Paper Fax. You get a 30-sheet auto document feeder for hard-copy faxing. Transmission speed is only 9 sec/page.* The MultiPASS 1000 uses Canon's Ultra High Quality (UHQ™) technology allowing it to scan photos in 64 halftone levels. Reception memory is 70 pages* and transmission memory is 50 pages.* What's more, you can send faxes even when your PC is off.

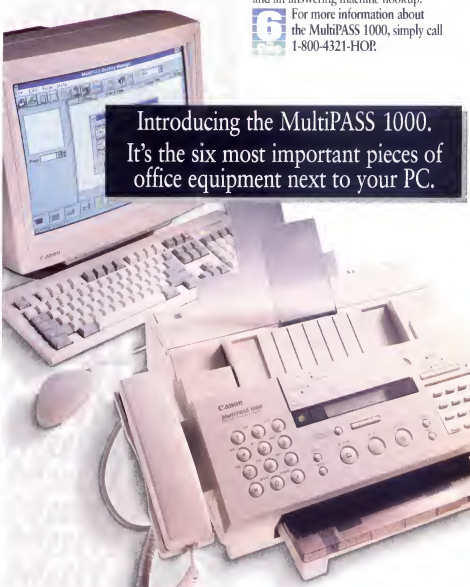
It's a PC Fax. With the MultiPASS 1000, you can fax directly from your PC at a speed faster than most faxboards. You can receive faxes while you're printing or when your PC is off. You can view faxes with zoom and full rotation, then save, print, forward or delete them. You can create a custom cover sheet and a virtually unlimited fax address book.

It's a Scanner. The MultiPASS 1000 offers TWAIN-compliant scanning with 200 x 200 dpi resolution and seven-level contrast control. It is compatible with most OCR software, enabling you to edit imported text without keying it in. And the 30-sheet auto document-feeder lets you easily scan multi-page documents.

It's a Copier. You can make up to 99 laser-quality plain paper copies. The automatic document feeder holds 30 sheets and the front-loading, adjustable paper cassette holds 200 letter– or legal–size sheets. Canon's exclusive UHQ technology produces excellent copies of fine text and graphics.

It's a full-featured Telephone. The MultiPASS 1000 telephone has on-hook dialing. You get a virtually unlimited telephone address book for point-and-click dialing, plus coded speed dialing to 80 locations. It has a Distinctive Ring Pattern Detector for use with special telephone company services. Plus it has a hold button with melody and an answering machine hookup.

For more information about the MultiPASS 1000, simply call 1-800-4321-HOP.



Introducing the MultiPASS 1000.
It's the six most important pieces of office equipment next to your PC.

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Canon

Online Service Is Liable for Libel

In the largest libel action ever filed against an online service, Prodigy Services Co. was found to be responsible for the content of its subscriber's messages. Because of this ruling, online services that have editorial control over messages sent on their bulletin boards can be responsible for postings that cross the line between opinion and libel.

The case resulted from a message posted on Prodigy's Money Talk bulletin board in October 1994. The message allegedly accused Stratton Oakmont Inc., a New York investment banking firm, of fraud in the initial public offering of a stock. The message described the offering as "major criminal fraud" and said Stratton's president, Daniel Porush, was a "soon to be proven criminal."

During the case, Prodigy argued that the online industry should be viewed as a bookstore or library, which merely is a passive conduit of information, making it impossible to sue for libel. Like a bookstore, the online industry contends it has no control over a subscriber's messages.

In a 15-page opinion, New York State Judge Stuart L. Ain said "computer bulletin boards should generally be regarded in the same context as bookstores, libraries, and network affiliates." But Prodigy's own policies, technology, and staffing caused it to be considered a publisher, Ain said.

When Prodigy began operating in 1990, it marketed itself as a family-oriented computer network, exercising editorial control over the content of messages posted on its bulletin boards. Because of this, Ain said, Prodigy differentiated itself from its competition and considered itself a publisher, rather than a bookstore.

Prodigy insisted that its policies have changed since 1990 and argued that because of the large volume of messages posted daily—about 60,000—manual review of messages can't be done. But Ain said Prodigy did have control over message content because it provided content guidelines for posted messages. Prodigy also controls content through an automatic software screening program and through an emergency delete function that's capable of removing offensive messages, Ain said.

"Prodigy's conscious choice, to gain the benefits of editorial control," Ain said, "has opened it up to a greater liability than CompuServe and other computer networks that make no such choice."

A 1991 case against CompuServe determined that the online service had "little or no editorial control" over its publication's contents. ●

Fingertip Browsing And Shopping

Forget the hours of looking around for that perfect gift. Forget running from store to store to make sure you get the best bargain. Home shopping (or at least a replica) has hit the Internet.

NYNEX Interactive Yellow Pages now is available on the World Wide Web (http://www.vtcom.fr/nynex), offering a complete online shopping directory that makes searching for businesses and web sites easy. The Yellow Pages provide a central location for both advertisers and shoppers to contact the businesses they want, enabling you to look up names, addresses, and phone numbers of more than 2.1 million businesses in the northeastern United States. From the listing, you can link directly to the Web sites of more than 400 of those companies with sound, video, and searching capabilities.

Once connected with a business site, you can learn about a company's products and services. Many of the sites contain lists, descriptions, photos, and videos of products and services. Clothing retailers include photos of clothes they sell while car company sites often contain photos and listings of cars on their lot. Users, in a sense, can view a company's merchandise catalog on the Internet, letting the user actually see and read about the products before making a purchase. If you choose to make a purchase, many of the Web sites have phone numbers to call to place orders. Some companies even include order forms or Internet addresses that can be used to place orders.

The Yellow Pages are well-organized and are designed to be easy to navigate with familiar A-Z headings, a Top 25 Headings Search of the most popular headings, and a Hot Sites listing of new and exciting Web sites.

The Home Page lets users begin searching for businesses and web sites.

Although the Yellow Pages include sites for clothing companies, car dealers, and cabinet makers, not all of the sites are strictly business, as the service includes sites for places such as CBS, David Letterman's Top Ten list, and Club Med.

The NYNEX Interactive Yellow Pages will never replace the true feeling one gets when shopping for products and services, but the pages are a much-needed technology, allowing you to connect with web sites from around the country.

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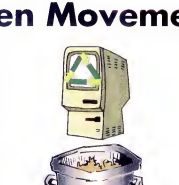
The Green Movement—Computer Style

Gone are the days when your old, outdated computer had to sit in the corner collecting dust. With the push toward recycling, many computer manufacturers have begun efforts to make computer recycling a reality.

Rapid changes in technology mean that about 60% of all new computers are now bought as replacements. Computer manufacturers fear a pile-up of old PCs—not only in people's homes but also in landfills and dumpsters where computers can create environmental hazards. Toxic substances leaking into groundwater supplies, batteries with high concentrations of waste, and CRTs and printed circuit boards full of lead all cause concern for environmentalists. Now, however, recycling companies can take nontoxic portions of the computer and incorporate them into asphalt and other materials.



If you have a computer that has outlived its usefulness, contact one of the following companies to find out how to recycle your computer.

• Dell Computer (800/955-3355) has an Asset Recovery Service that handles recycling, even if the equipment wasn't made by Dell. Nonfunctional or older products with low resale value are destroyed. Customers recycling valuable equipment receive credit toward the purchase of new Dell products.

• Hewlett-Packard (800/355-5111) is offering a Cash In & Trade Up promotion where you can trade in your HP and non-HP laser printers for credit toward new printers. All laser printers received through the Cash In & Trade Up promotion will be recycled and refurbished.

• IBM (800/426-3333) is considering implementing a take-back program and is pioneering a concept that converts old computer keyboards into new ones.

• Compaq (800/345-1518) offers "green machines" with low power consumption and systems that can be upgraded to provide longer life cycles.

• Apple (800/776-2333) offers a battery and toner cartridge recycling program. Apple has addressed many environmental concerns by eliminating the use of ozone-depleting CFCs and has switched from bleached-white to recycled-brown cardboard for product packaging.

Most recyclers will give varying amounts of money depending upon the usability of the system. Consider donating your system to a school or church or contacting organizations that specialize in placing pre-owned computers with needy users. ●

For More Information:

Aurora Electronics
(800) 827-0999
(310) 827-0999

Boating Lessons

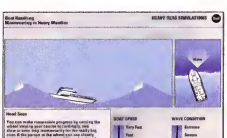
Always wanted to learn how to dock a boat? Want to learn more about navigational charts and emergency boating procedures? If so, Hearst New Media and Technology's *Hands-On Powerboating* is the CD-ROM for you. Through this program, you can learn proper boat-handling and piloting procedures.

The CD-ROM is a completely interactive experience, featuring a new way to experience boating. The program is designed for boating enthusiasts, as well as beginning boaters.

For those who are just beginning, the program includes a tour that will take you through its important features, including safety and driving instructions.

After going through the tour, the program lets you experience maneuvering simulators where you can practice docking a boat. You also can see navigational charts that let you plan a simulated voyage, lifesaving video demonstrations on fighting fires and helicopter rescues, and U.S. Coast Guard "Rules of the Road" demonstrations.

The CD-ROM's simulators test your powerboating skills by providing challenges along the way. A Heavy Seas simulator models information needed to handle a boat on the high seas. The Inlet Running Simulator illustrates the dangers of running an inlet and gives hints that can help develop your skills in this area. Through these simulators, the program can provide important advice and practice for your voyages.



***Hands-On Powerboating* lets you practice navigating a boat in heavy seas.**

Although the simulators will never replace real-life experience with waves, currents, and other natural phenomena, they can give you a general idea of boating navigation and help you prepare before getting out on the water.

Overall, Hands-On Powerboating, priced at about $50, can be both informative and entertaining. With important docking, navigation, and lifesaving instructions, the program will be an asset to anyone owning a boat.

For More Information:

Hands-On Powerboating
Hearst New Media and Technology
(800) 685-3322
(212) 649-2819 ●

History Learning Made Easy

Writing a history report may not be your idea of an exciting way to spend a day—hours of research, collecting information, and finding pictures and maps. But all this has changed with the introduction of Compton's *Encyclopedia of American History*, available on CD-ROM.

Compton's Encyclopedia makes writing a history report or learning about history in general easy, fun, and exciting. All together, the Encyclopedia is a user-friendly, interactive way to answer your questions about history and to research specific topics.

This program is designed like a history book, starting with a chapter entitled the Age of Discovery and ending with a look toward the new century. But that's where the typical material ends. Each chapter incorporates various tables, videos, essays, and slides to make the learning experience more valuable. The chapters contain essays that discuss historian's viewpoints, windows that explain difficult concepts, and musical selections related to the chapter.

Some of the Encyclopedia's best features are found in the menu bar. Through this menu, Encyclopedia users can go on a pictorial tour of history. The menu also features a notebook, which allows you to paste text and pictures from the Encyclopedia and add your own thoughts and notes to be printed later.

A unique feature of Compton's Encyclopedia is the idea search, which lets you type in a specific subject. The program then will browse through its files and retrieve those that contain the subject for which you are looking. We

The *Encyclopedia of American History* lets you explore history from creation to the present.

tried to find a subject Compton's Encyclopedia overlooked, but every subject entered in the search was in the Encyclopedia. In fact, the Encyclopedia often had multiple listings for each subject.

The CD-ROM also includes an atlas, from which you can find countries and cities throughout the world. A multimedia path takes you to a listing of thousands of different pictures, maps, movies, and sounds included in the Encyclopedia. A timeline path gives details of the dates, locations, and general information of nearly every major event in history.

The Encyclopedia is easy to use, with mouse-only capabilities, online help, and a menu path constantly on-screen. The CD-ROM runs best with a 256-color monitor and a sound-wave compatible computer.

Priced at around $40, the Encyclopedia is worth the money for children in school or for adults who are history fanatics.

For More Information:

Encyclopedia of American History
Compton's New Media
(800) 862-2206
(619) 929-2500 ●

Haute Couture
On Your Home Computer

Wouldn't it be nice if we each could have a personal tailor living in our homes? Now it's possible to have one living in your computer, thanks to LivingSoft's *Dress Shop* 2.0. This software is designed to help amateurs create clothes with a custom fit. It includes patterns that provide hundreds of variations of skirts, dresses, pants, shorts, blouses, vests, and jackets. In addition to the current pattern selection, the software is designed so that new patterns can be added as they become available from LivingSoft.

The first step in this high-tech designing process is to take measurements. The software provides two measuring modes. Regular is faster and easier than SuperFit because it uses about half the number of measurements. SuperFit is designed to accommodate any asymmetric measurements a person might have, such as one shoulder being higher than the other. Dress Shop provides a measuring diagram and charts for each mode.

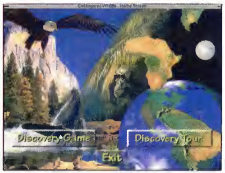
Once you have your measurements, enter them into your computer, select the pattern(s) you want to use, and Dress Shop takes over. It'll create a pattern sized to your measurements, which should mean no alterations in the finished garment. You can save the pattern pieces to a file or print them. (This program will work with printers of all types—dot matrix, inkjet, and laser—as well as some plotters. It can support either continuous feed or single sheet.) All you have to do is tape the pieces together, along clearly marked lines, and begin working with your fabric.

Currently, Dress Shop is designed to create women's clothing, though some of the pieces, such as pants, can be altered for men or children. LivingSoft is currently developing software for men's and children's clothing, as well as a version for Macintosh users.

Dress Shop sells for about $95. You also can choose to buy the software for just one type of garment (pants, skirts, bodices, or dresses); these smaller kits are available for $29.95 direct from LivingSoft. There is also a Basic Four kit available from the company for $79.95; it includes everything in the four smaller sets, but not the shorts, vests, or jackets that come in the full package.

For More Information:

Dress Shop 2.0
LivingSoft Inc.
(800) 626-1262
(916) 253-2700 ●



***Discovering Endangered Wildlife* has puzzles, videos, and games that let users study animals worldwide.**

Take A Trip On The Wild Side

Are you tired of all the video games your kids play? Seen enough of Rambo, Peanuts, and *Myst* to last a lifetime? If so, LYRIQ International's *Discovering Endangered Wildlife* is the right choice for your family.

Discovering Endangered Wildlife lets you and your family go on a journey through rain forests, mountains, and oceans in order to save some of the world's most endangered species. Along the way, you'll learn about each species while solving puzzles and answering questions. Overall, the program will provide interactive fun for the entire family.

The CD-ROM covers numerous animals, including the panda, orangutan, sea turtle, kangaroo, and bald eagle. Your quest is to learn more about each of these animals, to learn ways you can help save the animals, and to make changes so that the animals can survive.

Discovering Endangered Wildlife offers many challenges—jigsaw puzzles, word finds, crossword puzzles, and matching squares. The program is recommended for ages 9 and older, so younger children may need the help of an adult, as we found some of the crossword, matching, and jigsaw puzzles extremely challenging.

The program also includes a discovery tour, which takes you to a map of the world. From this map, you can pick any continent to learn more about its endangered wildlife. Once chosen, a picture list of the continent's endangered species will appear. From this list, choose any animal to learn more about its habitat, food, lifestyle, and threats, as well as fun facts about each animal. Fact sheets containing information about the endangered animals can be printed for help with school reports.

This CD-ROM should be run on a 256-color monitor with sound capabilities because it includes hundreds of pictures, videos, and sounds that can't be missed. Both the instruction book and program are written in a style that can be easily understood by children and computer novices. The program was designed and tested for use at home and in school and is endorsed by the National Wildlife Federation.

Discovering Endangered Wildlife, priced at about $70, is an investment worth making for the young, as well as those who are young at heart.

For More Information:

Discovering Endangered Wildlife
LYRIQ International
(800) 433-4464
(203) 250-2070 ●

No Dialing Needed

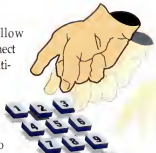
If you're tired of punching in oodles of numbers each time you attempt your online journeys, the Hayes Corporation may be of help, with the *Smartcom BBS Dialer*. The BBS Dialer has the ability to become your own personal rolodex of numbers. By simple clicking, this program automatically dials the number you want.

This means, instead of spending your time plugging in numbers every time you want to go online, the Smartcom BBS Dialer will do it for you. You save time in two other ways as well. First, the BBS Dialer has numbers from all over the country ready for you to tap into. Second, if you have numbers you want to add to your rolodex so you can call your other favorite BBSes (bulletin board systems), the Dialer lets you easily insert them.

The idea of the Smartcom BBS Dialer is a great one, as it's a convenience as well as time-saver, but there are a few annoying quirks. The largest is the time constraint Hayes enforces when you're connected to Hayes online. There's a 30-minute limit per day. As we tried to explore the system, we were cut off halfway through and had to begin again the next day. These time limits won't be a problem, though, after you're accustomed to the system. Hayes understandably explains this ration of time in that they only have so many lines that can be used, and they want to allow everyone the chance to connect with them. They have a legitimate concern, as we tried to get online with them in the afternoons and found it nearly impossible.

Hayes' BBS system also lets you download Hayes' entire number list onto your hard drive. Thus, after initially going online with Hayes, you won't have to do it again if all you're wanting is other online numbers. This lets you have all the numbers for your own permanent access.

Although there are many numbers given by the BBS system, things become tedious after trying to go online with many of the provided numbers. We ran into a high percentage of numbers that were no longer in service. This



may annoy you when you first start using the BBS, but the problem will probably alleviate itself after you've established the regular numbers you want to call.

For More Information:

Smartcom BBS Dialer
Hayes Corporation
(404) 441-1617 ●

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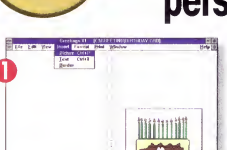

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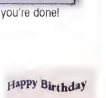

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Thanks!

Seek And Ye Shall FIND

Have you ever spent what seemed like years searching line by line through a lengthy file, trying to find one reference? If you have DOS 5.0 and newer, you don't need to spend precious time weeding through the entire file. Those versions of DOS include a file, Find.exe, that will search for a string of characters in a specified file or files and then display any lines containing that string. (Older versions of DOS had the FIND command, but 5.0 and 6.0 have some significant differences; for the purpose of this article, we'll just talk about the recent versions.) One important thing to remember is that this command will search for an exact copy of whatever you have specified. This means that if you are looking for "abcd", it will not consider "Abcd" a match because of the capitalization of the letter "a" in the second string.

The FIND command has several **switches** (segments that you can insert into a command to fine-tune it):

/V—Displays lines that *don't* contain the specified string
/C—Reports the number of lines containing the specified string without displaying the actual lines
/N—Displays the file line number with each line displayed
/I— Finds the string without worrying about whether the letters are upper- or lowercase

In the FIND command, insert the appropriate switch just after the word "find". For example, type:

```
find /i "word" vocab.txt
```

to find lines containing "word", spelled with or without capital letters, in a file named Vocab.txt. If the file you want to search isn't in the current directory, you will need to specify the entire path by typing:

```
find /i "word" c:\windows\vocab.txt
```

at the DOS prompt and pressing ENTER. You can use FIND to redirect the results of your search to a file. For instance, you might want to find all of the local addresses in a personal address list and add them to a file of local contacts you've created. To do this, you would search for your town's name and redirect the output by typing:

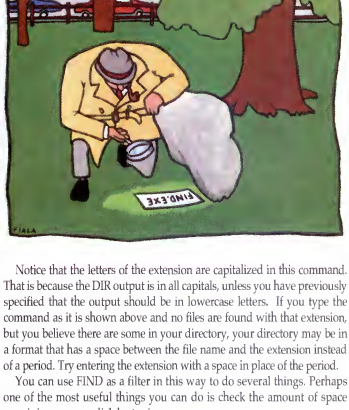
```
find "Lincoln" address.txt > contact.txt
```

The ">" in the above command string tells DOS to copy any address with "Lincoln" in it from the Address.txt file to Contact.txt.

As A Filter

You also can use FIND as a filter to search the output of a command such as DIR. For example, if you want to search the current directory for all file names with the extension .SYS, type:

```
dir ¦ find ".SYS"
```



Notice that the letters of the extension are capitalized in this command. That is because the DIR output is in all capitals, unless you have previously specified that the output should be in lowercase letters. If you type the command as it is shown above and no files are found with that extension, but you believe there are some in your directory, your directory may be in a format that has a space between the file name and the extension instead of a period. Try entering the extension with a space in place of the period.

You can use FIND as a filter in this way to do several things. Perhaps one of the most useful things you can do is check the amount of space remaining on your disk by typing:

```
dir ¦ find "free"
```

What FIND *Won't* Find

The FIND command has some drawbacks. First, you need a fairly good idea of what you are looking for and where it might be before you can tell your computer to search for it. For example, when we were looking for "word" in the first example, we had to know that we were looking for it in the file named Vocab.txt. Second, you can't use FIND with **wildcard** characters. These are characters that can be substituted for others. The question mark (?) can be substituted for one character, and the asterisk (*) can be substituted for more than one character. These are useful if you can remember only part of a file name, or if you want to search for all files beginning with a certain letter. Unfortunately, FIND does not allow these characters to be substituted for part of the character string for which you are searching.

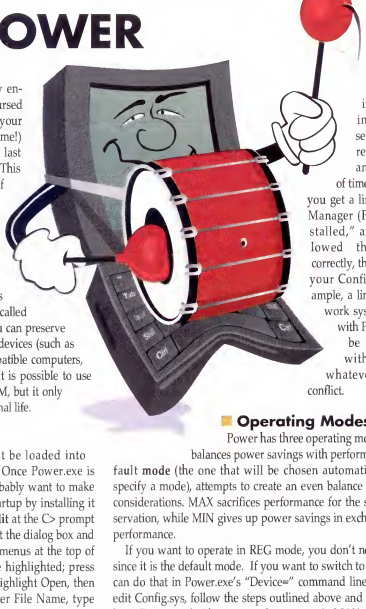
Other than those limitations, FIND can be a very useful tool. Although you may not use it very often, it should at least keep you from any more of those time-consuming games of hide-and-seek with your files. ●

by Diana K. McLean

Portable POWER

If you use a laptop computer, you've probably encountered at least one situation in which you cursed the battery for not lasting longer. (If not, count your blessings and read on—it's probably a matter of time!) The average portable computer's battery will only last two to four hours before needing to be recharged. (This varies with the size of the battery and the amount of power required by the computer's components.)

Until 1992, many portable computers had power conservation features, although they varied from one manufacturer to another. In 1992, Intel Corp. and Microsoft Corp. agreed on a common standard for power reduction, called **Advanced Power Management** (APM). Many newer portables are compatible with APM and come with a program called Power, also available with DOS 6.0. With Power, you can preserve battery power by shutting down selected hardware devices (such as the display) when they aren't in use. On APM-compatible computers, the life of the battery can be extended up to 25%. It is possible to use Power with portables that are incompatible with APM, but it only results in an increase of about 5% of the battery's normal life.



Installing The Device Driver

Power.exe, the device driver for Power, must be loaded into memory before the Power program can be used. Once Power.exe is loaded, power conservation begins, so you will probably want to make Power.exe load into memory automatically upon startup by installing it in your Config.sys file. You can do this by typing **edit** at the C> prompt to access MS-DOS Editor. Next, press ESC to get past the dialog box and into Editor, then press the ALT key to activate the menus at the top of the screen. The File menu heading should now be highlighted; press ENTER to activate it, and use the down arrow to highlight Open, then press ENTER again. In the Open dialog box, under File Name, type **config.sys** and hit ENTER.Your Config.sys file should now appear on-screen. Scroll to the bottom of the file, and add the following line:

```
device=c:\dos\power.exe
```

(*Note: Before changing anything in your Config.sys file, make a backup copy on diskette in case something goes wrong.*) You won't need to specify the DEVICEHIGH command in this line because Power.exe automatically loads itself into high memory. If you want it to load into low memory instead, you should change the command line by typing:

```
device=c:\dos\power.exe /low
```

Once you've added either of the above lines to Config.sys, press ALT-F to open the File menu. Arrow down to Exit and hit ENTER. A dialog box will ask whether you want to save the file; the Yes option will be highlighted, so press ENTER again.You will return to the DOS prompt; now all you need to do to activate the power conservation feature is type **power** and press ENTER. A display titled "Power Management Status" will give you two important pieces of information: what setting Power is currently operating on, and the percentage of time the CPU is idle. If you get a line saying, "Power Manager (Power.exe) not installed," and you have followed the above steps correctly, there is something in your Config.sys file (for example, a line related to a network system) that conflicts with Power, and you will be unable to use it without eliminating whatever is causing the conflict.

Operating Modes

Power has three operating modes, each of which balances power savings with performance. REG, the **default mode** (the one that will be chosen automatically if you don't specify a mode), attempts to create an even balance between these two considerations. MAX sacrifices performance for the sake of power conservation, while MIN gives up power savings in exchange for improved performance.

If you want to operate in REG mode, you don't need to do anything since it is the default mode. If you want to switch to MAX or MIN, you can do that in Power.exe's "Device=" command line in Config.sys. (To edit Config.sys, follow the steps outlined above and alter the command line.) For example, if you wanted to operate in MAX mode, type:

```
device=c:\dos\power.exe adv:max
```

If you want to turn off the power conservation program, type:

```
device=c:\dos\power.exe /off
```

in your Config.sys file.

When Not To Use Power

Many portables have built-in utility programs that perform the same function as Power. If this is the case with your laptop, you will probably be safer using the program that came with your computer. If your computer is not a portable, you can safely delete Power.exe. Again, be very careful when deleting or altering DOS files. It is always a good idea to have a backup copy on diskette before making such changes—just in case. ●

by Diana K. McLean

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Discovering Your Windows Options

When you're getting ready for a special occasion—a big date, a killer job interview, or a major presentation to a million-dollar account prospect—you think hard about the image you want to portray, including the clothes you need to wear to achieve that image. You'll open your closet and try on several different outfits. Maybe you'll even go shopping. But one thing's for sure—you'll check out all of your options before making a decision.

Just as you're not stuck with that navy suit, white shirt or blouse, and red tie or scarf, you have some options when choosing how you want the windows and icons in Microsoft Windows to appear on-screen. The window and icon arrangements in Program Manager and its group windows are probably just fine when you begin using Windows. You'll soon discover, though, that Windows is more useful when certain windows are resized and the groups are arranged in a specific way. We'll explore some ways that you can alter the appearance of Windows by looking at the commands available in Windows' Options menu.

The Options Menu

There are three commands that appear in the drop-down Options menu: Auto Arrange, Minimize On Use, and Save Settings on Exit. When a check mark appears to the left of one of these commands, that means the option is enabled. If no check mark appears, it is disabled. To enable or disable an option, click it with the mouse pointer.

Auto Arrange. When enabled, the Auto Arrange command makes the icons in a group window automatically arrange themselves whenever the window is resized, new items are added, or items are moved.

Enable this option and open a group window like Accessories. Move an icon in the Accessories window a little and let it go. All of the icons will move to a nice, neat arrangement.

If Auto Arrange is disabled, you must manually click on icons with the mouse pointer and drag them (hold down the mouse button while moving the mouse pointer) to place them in a new position. You also can choose the Arrange Icons command from the Window menu. This will evenly arrange icons in a group window in rows.

NOTE: You also can arrange the windows and icons in the Program Manager desktop. The Arrange Icons command discussed above will place group icons in rows. The Tile command from the Window menu will resize and rearrange the open group windows so they appear side by side. The Cascade command in the Window menu will resize and layer open group windows so each title bar is visible.

Minimize On Use. When Minimize on Use is enabled, the Program Manager shrinks to an icon (or **minimizes**) when you start an application. When this option is disabled, the Program Manager stays open on the desktop.

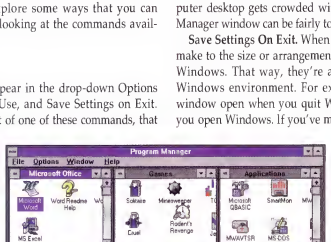
This may not appear to be a useful option at first, but when your computer desktop gets crowded with lots of open windows, the Program Manager window can be fairly tough to find.

Save Settings On Exit. When this option is enabled, the changes you make to the size or arrangement of windows are saved when you exit Windows. That way, they're available the next time you open the Windows environment. For example, if you leave the Main group window open when you quit Windows, it will be open the next time you open Windows. If you've made an arrangement you don't wish to keep, disable this option before exiting Windows.

NOTE: You also can save changes to the arrangement of groups or the sizes of windows without exiting Windows. To do this, hold down the SHIFT key and click the Exit Windows command on the File menu; the changes will be saved, but you won't actually exit Windows.

Once you experiment with the window and icon arrangement options built into Windows' Options menu, you'll discover that they're quite useful. Customizing your Windows desktop can make you more efficient and more comfortable. And that's an option you certainly want to explore. ●

by Lori Beckmann Johnson



By choosing the Tile option from the Window menu, you can arrange the open program windows in Program Manager so they are side by side.

Making Your Keyboard Right For You

In a world where customization has become an important feature in computers, Microsoft Windows has developed a way for you to adjust your keyboard's settings to fit your needs. Although Microsoft is only in the beginning phases of keyboard customization, the company has developed ways for you to adjust keyboard letter repeat rates, mouse controls, and even the keyboard's language.

When computers first came out, it was always the user who had to conform to the computer keyboard. Although this is still partially true, users are now able to make certain adjustments to the keyboard to make their computer more user-friendly. With repeat rates and mouse controls, adaptability seems to be what Microsoft was looking for. Although some people may never feel the need to adjust these keyboard functions, those who do make adjustments will notice a definite difference in the way the keyboard operates.

Customizing Repeat Rates

Microsoft Windows lets you adjust the keyboard **repeat rate** (how fast a key repeats when you press and hold it down) and the **delay before first repeat** (how long it takes the computer to repeat a character after you press and hold the key down). To adjust keyboard repeat rates:

1. Choose the Main icon from Program Manager.
2. Click on the Control Panel icon.
3. Choose the Keyboard icon in the Control Panel.
4. Adjust the Delay Before First Repeat by dragging the scroll box toward Long or Short, or use the right or left arrow key.
5. Adjust the Repeat Rate by dragging the scroll box toward Slow or Fast, or use the right or left arrow key.
6. To test either adjustment, click on the test box and press and hold any key.

If you type quickly, a fast repeat and shorter delay rate are probably best for you. People who tend to leave their fingers on the keys may want to choose a slower repeat and longer delay rate to avoid having a single letter typed across their screen.

Adjusting The Mouse

You also can adjust your mouse's **tracking speed** (the rate at which the pointer travels across the screen) and the **double-click speed** (the rate at which Windows registers a double-click). To make adjustments to the mouse:

1. Choose the Main icon in Program Manager.
2. Click on the Control Panel icon.
3. Choose the Mouse icon in the Control Panel.
4. Adjust the Mouse Tracking Speed by dragging the scroll box toward Slow or Fast, or use the right or left arrow key.
5. Adjust the Double Click Speed by dragging the scroll box toward Slow or Fast, or use the right or left arrow key.
6. To test your mouse's new double-click speed, click on the test box and click the left or right mouse button.

Your mouse's double-click and tracking speeds are more or less a matter of personal preference. The adjustments depend upon what you are most comfortable with.

Changing The Keyboard's Language

In today's multilingual society, it is sometimes necessary to compose documents in other languages. Using the international keyboard settings in Windows can help you with this task. Through the International icon in the Control Panel, you can change the keyboard's language, layout, and measurement, as well as the keyboard's numbers, dates, times, and currency values. Windows is equipped to accommodate more than 10 languages in 24 countries.

Since different countries use different keyboards, it is important to note that some keys will be disabled when changed to certain languages. When changing keyboard languages, you must have Disk 2 of the Microsoft Windows for Workgroups program inserted in the A: drive. To change your keyboard's language:

1. Choose the Main icon in Program Manager.
2. Click on the Control Panel icon.
3. Choose the International icon in the Control Panel.
4. From the International menu, you can change the country, language, keyboard layout, and measurements. To make changes, click on the down arrow to the right of the option you want to change. This will pull down a menu containing possible choices.
5. After you choose a country, the measurement, list separator, date, time, currency, and number options will change automatically to fit the country. If you wish to change any of these options, click on the Change box and type in the appropriate format.

Note that changing the computer's language will not change the keys on the keyboard. It is best to leave the Keyboard Layout set as U.S./International. This leaves most keys where you would expect and lets you use the ALT key on the right side of the spacebar with certain characters to change to international characters. ●

by Corey Russman

DOS Command Dictionary

How To Use Different DOS Commands

FC

When creating a document, it's often easy to save the file in more than one drive. Having the same file in multiple drives, however, often is unnecessary and only takes up more of your computer's memory. To get rid of these similar files, the FC, or FILE COMPARE, command may be helpful. The FC command, found in DOS 2.0 and newer, compares two files to find out if they are identical. When used with the appropriate commands, FC also will identify any differences between the two files.

To compare two files named please.doc and thanks.doc, type:

```
fc a:\please.doc c:\thanks.doc
```

at the C> prompt, then press ENTER. Note that the command must contain the drive location of the files to be compared (usually A:, B:, or C:). The FC command then will scan through the specified files and indicate if they're identical. If the files aren't identical, the command will display the differences. Identical comparisons will automatically be synchronized.

Note that the computer may easily overlook small differences in files. In most instances, computer users are only interested in whether the two compared files are identical, but using this command will create a list of all file differences as well. The command does provide for an abbreviated output of these differences.

If you wanted to compare a **wildcard** file to a single file in the C: drive, you would type:

```
fc thanks.* thanks.doc
```

at the DOS prompt and press ENTER. (A wildcard is a symbol used to represent a single character or multiple characters in a file name.) When comparing a wildcard file to a single file, all the files that match the wildcard specification are compared with the single file specified. In this example, files named thanks with any extension are compared with the thanks.doc file. Note that because thanks.doc matches the thanks.* file specification, thanks.doc will be included in the comparison but won't cause an error.

Although you'll usually use the FC command without any switches, there are several that can be used to help with comparisons. Switch commands should be entered at the end of the FC command, such as:

```
fc please.doc thanks.doc /a /b /20 . . .
```

The following list tells what each switch would do when attached to the FC command.

- **/A** Displays an abbreviated output of the differences between the two files. This can be a quick and easy way to find out just how similar two files are.
- **/B** Performs a binary comparison, the default for program files.
- **/C** Ignores upper- and lower-case differentiations in file text.
- **/L** Compares files line-by-line. Note that if a mismatch between files is detected, the lines will be resynchronized.
- **/LB*n*** Is similar to /L, but it sets the internal line buffer to hold on *n* number of lines. The default setting is 100. The FC command is canceled if the number of consecutive lines that are different in the two files exceeds this number.
- **/N** Displays line numbers. This is an easy way to determine where the differences in two files exist.
- **/T** Doesn't convert tabs into spaces. If this switch isn't used, FC converts tabs into spaces. Note that the FC command will indicate differences in tabs and spaces.
- **/W** Ignores extra white space in the files.
- **/*nnn*** Specifies how many consecutive lines (*nnn*) must match before FC considers the files identical. The default setting is two.

FC shouldn't be confused with the COMP command. COMP was replaced by FC because FC has greater flexibility and more switch options, allowing for better comparisons between files.

EDIT

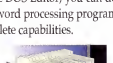
The EDIT command will give you access to DOS Editor, which is a basic text editor used to edit DOS program files, such as Autoexec.bat. The EDIT command, introduced with DOS 5.0, is easier to use and more flexible than other programs because it contains menus to make command selection easier. EDIT doesn't place hidden commands into your files, like some word processing programs do. This makes EDIT ideal for editing all your system files.

To use EDIT to make changes to your Autoexec.bat file, type:

```
edit autoexec.bat
```

at the DOS prompt and hit ENTER. Note that if no file is specified, the DOS Editor will prompt you with a help screen, indicating you must

input a file name. Once activated, the DOS Editor looks similar to other word processing screens, with menus that can be accessed by using the ALT key in combination with other keys or with a mouse. When using the DOS Editor, you can delete, add, or change text just as you would in a word processing program. The program also includes copy, move, and delete capabilities.



FILES

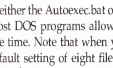
The FILES command, implemented with DOS 2.0, lets you specify the number of files that can be opened simultaneously. Increasing the number of files that can be opened at once creates more **file handles** (areas of internal memory that DOS uses to keep track of an open file).

A typical application may need to open several program, data, backup, and temporary files just to run. This adds up to more files than you would expect. If the FILES command doesn't let every file open, a program won't run.

To change the number of files that can be open, type:

files=n (with n representing the desired number)

in either the Autoexec.bat or Config.sys files by using the EDIT command. Most DOS programs allow between eight and 255 files to be opened at one time. Note that when you install a program requiring more than the default setting of eight files, the installation program may automatically insert the needed FILES command in your Config.sys file. Because of this, you may never have to add or modify your FILES command.



SETVER

The SETVER command, which was available beginning with DOS 5.0, lets you select the version of DOS you need to run a particular application. Some applications require a certain version of DOS because they depend on a DOS feature introduced with that version. For example, the EDIT command, which was introduced with DOS 5.0, can't be run on DOS versions older than 5.0. Note that most programs like EDIT will test the system to make sure the version of DOS running on your computer is 5.0 or newer.

Some programs, however, only test for a specific version of DOS. Because of this, a program designed to run under DOS 5.0 might display the error message "Incorrect DOS version" if the program were to be run using DOS 6.0. SETVER was designed to correct this problem. Note that it's sometimes necessary for a program to test for a specific DOS version. In most cases, though, it's only a programming error.

The Setver.exe driver loads a table of program names and DOS version numbers into the computer's internal memory. Whenever a DOS program is asked to input its version number, SETVER scans the version table and, if the program is listed in the table, SETVER tells the program the appropriate version of DOS is being used. The computer, in a sense, is fooled into thinking that an older version of DOS is being used.

To use the SETVER command, the following "Device=" line must be added to the Config.sys file:

device=c:\dos\setver.exe

The Setver.exe driver then will load a default table that is supplied with DOS.

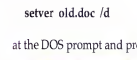
Note that updated versions of DOS may require the SETVER command to run programs and commands that are no longer provided with DOS. To add an entry in the SETVER table for a program called Old.doc, which requires DOS 6.0, type:

setver old.doc 6.0

at the C> prompt and hit ENTER. To delete Old.doc from the SETVER table, type:

setver old.doc /d

at the DOS prompt and press ENTER.



MOVE

The MOVE command was introduced with DOS 6.0. MOVE lets you move files from one directory to another, as well as change the name of a directory. This command makes renaming directories much easier because in the past, a series of commands needed to be entered.

In order to rename a directory, type:

move \ss94\lion \ss94\pest

at the C> prompt and press ENTER. In this example, the subdirectory LION is renamed PEST. Note that the directory being renamed can't be the current directory, such as SS94.

With the MOVE command, there are also several ways a file can be moved from one directory to another and from one drive to another. The basic format of a move command is:

move source-1 target-source

After typing in the command at the DOS prompt, press ENTER. In this example, the file source-1 is being moved to the TARGET-SOURCE directory. More than one file can be moved into a new directory at one time by inserting multiple file names before the target drive or directory, such as:

move d:\lion \pest c:

Based on this MOVE command, both the lion and pest files, which are found in the D: drive, will be moved to the C: drive.

The MOVE command also has the capability of renaming a file while moving it. To do this, type:

move c:\lion.doc d:\pest.doc

at the command prompt and press ENTER. This example renames the Lion.doc to Pest.doc and moves it from the C: drive to the D: drive.

Note that caution should be used when moving files into a directory with existing files, as the MOVE command will overwrite existing files in the target directory without warning. ●

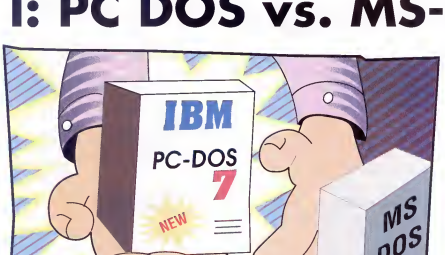
by Corey Russman

PC DOS 7.0

Part I: PC DOS vs. MS-DOS

A DOS is a DOS, of course. Right? Not in IBM's eyes, and "Big Blue" is out to convince you otherwise, too.

MS-DOS, Microsoft's brand of DOS, has dominated the operating system market since the first IBM personal computer rolled out of the factory a decade and a half ago. IBM has always made its own brand of DOS, called PC DOS, but for many years it mirrored MS-DOS and wasn't heavily marketed as an alternative. Beginning with version 5.0, IBM began adding features to PC DOS to differentiate it from MS-DOS, putting the two computing giants in direct competition.



kOsch

You probably have never given much consideration to your brand of DOS. With the future of MS-DOS somewhat unknown, though, it may be time to investigate your options. In this three-part series, we'll discuss in-depth the newest DOS, PC DOS 7.0.

DOS Differences

DOS, or disk operating system, is the operating system used with most IBM-compatible computers. The operating system controls all aspects of your computer. DOS uses a **text-based interface**, in which commands are typed at the DOS prompt, to communicate with users. Some users find an operating system with a **graphical user interface** (GUI), such as is used with IBM's OS/2 or with Apple's Macintosh, easier to manipulate because it uses menus and icons to communicate with users. Microsoft Windows 3.1 is a GUI as well, but it's an operating environment because it requires DOS. Windows 3.1 can't run your computer on its own, so it's not an operating system.

When you purchase a computer, it most likely has MS-DOS installed. The latest version of MS-DOS is 6.22. Why would you want to consider another brand of DOS? Because it's doubtful Microsoft will update MS-DOS anytime soon. Microsoft plans to market its upcoming (and often-delayed) Windows 95 GUI operating system as its primary upgrade for MS-DOS users.

With MS-DOS' future in limbo, IBM is hoping users who like DOS or a text-based interface will turn to PC DOS to obtain the newest features. This month, we'll show you how to install PC DOS and discuss a few of the main differences between MS-DOS and PC DOS.

Installation

The system requirements for PC DOS are minimal: 512 kilobytes (KB) of conventional memory and 18.5 megabytes (MB) of hard disk space (although you can install PC DOS with as little as 6MB of hard disk space). If you are upgrading from a previous version of MS-DOS or PC DOS, it must be at least version 3.3. If you have a mouse installed on your computer, you can use it during the setup procedure.

Before installing PC DOS, you may want to make a backup copy of your current version of DOS by choosing the "Backup previous DOS files" command during the Setup program. If you later decide you want to remove PC DOS and return to your previous version of DOS, you can use Setup to uninstall PC DOS.

To begin Setup, insert diskette number 1 in the diskette drive. At the DOS prompt, type:

```
a:setup
```

and hit ENTER. The PC DOS Setup program will take you through a series of menus. (If you need help at any time with a menu, press the F1 function key.) The first menu lets you set items like time and date. Then you can select the various add-on tools for PC DOS. Oddly, the add-on tools are defaulted to "No," meaning they won't be added unless you manually specify them. Most people who are switching to PC DOS probably will want the majority of these tools, unless you have a separate software program that performs the same function or if your hard drive is cramped for space. To select each tool, highlight it (using the arrow keys or the mouse) and hit ENTER to change the installation default from No to Yes. If you initially choose to skip installation of some tools but want them later, you can insert PC DOS setup diskette number 1, type `a:setup /e` at the DOS prompt, and hit ENTER. PC DOS Setup then will give you the chance to install the tools.

The PC DOS add-on tools are PenDOS, for pen-based applications; PC DOS Shell, for giving DOS more of a GUI look; Phoenix PCMCIA support, for ensuring PC Card

compatibility; Central Point Undelete for Windows, for protecting against inadvertent Windows deletions; IBM AntiVirus, for protecting against viruses in Windows and DOS; REXX Language Support, for writing programs; *Stacker*, for compressing data to save hard drive space; and Central Point Backup, for backing up information in Windows and DOS. Some tools are only for Microsoft Windows; if you don't have Windows installed, you won't see those in the list. *(NOTE: We'll discuss each of these tools in depth in the third part of this series in October's issue.)*

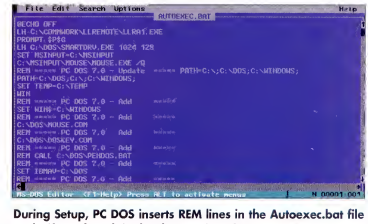
If you make a mistake at any point while going through the menus, you can return to the previous screen using the ESC key.

On the final menu, you'll have the chance to back up your previous DOS version, as we discussed earlier. Be sure to have plenty of diskettes available; depending on your previous version of DOS, you could need as many as 10 or even more.

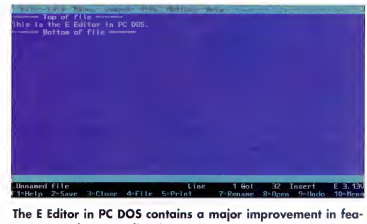
After specifying whether you want to back up the DOS files and selecting the directories for your DOS and Windows files, installation begins. Swap diskettes as you're prompted. If you choose not to install all of the add-on tools, you won't need all five diskettes for installation. The complete installation procedure takes 20 to 30 minutes.

Just before installation is completed, Setup prompts you on whether you want to view or edit changes made to your Autoexec.bat or Config.sys files. PC DOS places a REM command in front of lines it changed, which has two benefits. First, it lets you see exactly what changes PC DOS made to the system files, and, second, it gives you the chance to return to the original setup. Notes about additions and editing PC DOS Setup made to individual lines are marked with the REM command, too. (REM is a DOS command that lets you add notes to a DOS file. DOS doesn't execute lines preceded by the REM command.) Even though PC DOS is extremely helpful in marking the changes it makes to Autoexec.bat and Config.sys, you still should make a backup copy of these two files and any .INI files in Windows prior to installation because PC DOS edits those files.

After viewing the Config.sys and Autoexec.bat files, PC DOS will reboot your computer.



During Setup, PC DOS inserts REM lines in the Autoexec.bat file to clarify and explain the changes it makes.



The E Editor in PC DOS contains a major improvement in features over the DOS Editor in MS-DOS.

Running PC DOS

If you've upgraded from MS-DOS, you shouldn't notice any differences after rebooting, other than your "Starting MS-DOS" message will be replaced by "Starting PC DOS". You shouldn't notice any changes in the way Windows starts, either.

If you installed some of the add-on tools, PC DOS will take control of your computer the first time you run DOS after installation. The PC DOS AntiVirus program will take a look at your hard disk.

If you had the PC DOS Shell installed, you'll be taken directly into the PC DOS Shell. If you'd rather work from the DOS prompt, you'll have to edit your Autoexec.bat file to remove the automatic starting of the PC DOS Shell. You must exit DOS Shell to do this. To exit the DOS Shell, hit ALT-F and X. From the DOS prompt, type:

```
edit autoexec.bat
```

and hit ENTER. Move the cursor to near the end of the file, and find the "c:\dos\dosshell" line. Type **rem** in front of the line to cancel the command. Hit ALT-F and S to save your changes. Then hit ALT-F and X to exit the DOS Editor. You'll have to restart the computer for the changes to take effect.

Under Windows

You'll notice a few changes inside Windows after installing PC DOS, although you won't actually notice Windows running any differently. You'll have a new program group, called PC DOS 7.0 Tools. Within the group, you'll have icons for IBM AntiVirus, Central Point Scheduler, Central Point Undelete, and Central Point Backup for Windows (if you chose to install them during Setup).

You'll also see icons for Error Messages, Command Reference, and REXX Reference. All three are information/help sources for PC DOS. All are available from the DOS command, too. We'll discuss their features later.

A PC DOS Prompt icon takes you into DOS. You can use the MS-DOS Prompt icon in Windows' Main program group to perform the same function. When you're ready to return to Windows, type **exit** at the DOS prompt and hit ENTER. It's not recommended you run DOS from inside Windows for an extended length of time or if you're going to perform a lot of file manipulation because it's less stable than working in DOS alone. Visiting the DOS prompt from Windows is best done only briefly.

A DOS Is A DOS Is A DOS . . .

If you're new to DOS, the PC DOS user guide will give you a crash course on DOS

basics. PC DOS 7.0 offers a number of improvements over MS-DOS 6.22, the most notable of which are the add-on tools. As far as the actual operating systems and the day-to-day operation of the two DOSes, though, the differences are few. We'll discuss some of the main differences that do exist.

Different Commands. We'll discuss in more depth how to use these commands, which are unique to PC DOS, in the second part of this series next month. For now, here's a brief explanation of some of the commands that differ between PC DOS and MS-DOS (we won't include commands here that are unique to the add-on programs):

ACALC—allows you to calculate a mathematical expression

BACKUP—a backup program similar to MSBACKUP

BROWSE—uses the E Editor to view a file as read-only

DCONVERT—converts a DoubleSpace compressed drive to a Stacker drive

E—starts the E Editor

EJECT—ejects a medium from a specified drive

JOIN—lets you connect a drive to a directory under another drive and view a single directory structure for the two drives

MOUSE—provides mouse support

QCONFIG—displays technical information about your computer similar to the MSD command

RAMBOOST—maintains and optimizes DOS memory similar to MEMMAKER

RESTORE—restores files backed up using the BACKUP command

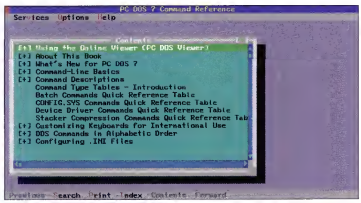
VIEW—lets you view an online help/information book

XDF/XDFCOPY—handles Extended Density Format diskettes.

PC DOS doesn't use some MS-DOS commands, such as EDIT, FASTHELP, MEMMAKER, MSBACKUP, MSD, QBASIC, and SCANDISK.

E Editor. The E Editor is used in PC DOS instead of the MS-DOS Editor used in MS-DOS. Both editing programs are designed to edit system files cleanly, similar to Notepad in Windows. While E Editor is much closer in features and performance to a word processing program than the MS-DOS Editor, it's doubtful you'd want to use the program for any major word processing project. The E Editor is mainly designed for editing system files or for typing brief memos or notes. Features found in E Editor that aren't available in MS-DOS Editor include the ability to use a pointing device, switch between open files, browse a file in read-only mode to avoid inadvertent changes, customize the E Editor, use a calculator function, draw boxes around text, and use expanded features for working with programming languages, such as C or REXX.

E Editor has numerous other text-editing functions, but we won't go into them any further here because any additional text-editing you might need would be better served by a word processing program. If you want to learn more about E Editor, consult Chapter 10 of your PC DOS 7.0 user guide.



PC DOS uses an online reference book to provide additional information about the DOS commands.

You may find PC DOS has enough new features to make it worthwhile.

Online Help. This is perhaps the most obvious difference between the two. While MS-DOS 6.22 offers an extensive online command reference section, PC DOS 7.0 gives command reference, an error message explanation, and a REXX command reference, all online. These references are available either in Windows or from the DOS prompt.

To view one of the online reference books from Windows, open the PC DOS 7.0 Tools window and double-click on the icon of the book you wish to view.

To view one of the online reference books from the DOS prompt, type view and hit ENTER. You'll move into the PC DOS Viewer screen, which is menu driven. Highlight the reference book you want to view and hit ENTER. Cmdref.inf is the command reference book, Doserror.inf is the DOS error messages book, and Dosrexx.inf is the REXX commands book.

System Diskette. When you format a diskette and create a system diskette, MS-DOS and PC DOS place different files on the diskette. (MS-DOS' system files are Io.sys, Msdos.sys, and Command.com, while PC DOS uses Ibmbio.com, Ibmdos.com, and Command.com.) If you created a system diskette in the past, prior to upgrading to PC DOS 7.0, you'll have to create a new one. The command is the same for both brands of DOS. At the DOS prompt, type:

```
format a: /s
```

and hit ENTER. A system diskette can be used to boot your computer if your hard disk fails and is unable to boot the system. You should always have a system diskette among your backup diskettes.

While PC DOS is fairly similar to MS-DOS, you may find it has enough new features to make it worthwhile to make a change. If you're having trouble making up your mind, though, stay tuned. We'll provide additional details in the next two installments of this series, giving you all of the information you need to determine whether a DOS *really* is a DOS. ●

by Kyle Schurman

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CD-ROM Reference Tools

The 21st century mind will need instant access to vast amounts of information. If you're strapped for shelf space, consider CD-ROM. A tiny compact disc has enough room for a large encyclopedia, and several other resources. You don't have to leave your desk or lug heavy volumes from library shelves to pursue cross-references; just enter a search command. And, since most CD-ROM references incorporate multimedia elements, you won't fall asleep while doing research.

With so many reference CD-ROMs available, here's a checklist of features to consider when you buy:

1. Intuitive user interface. Look for on-screen instructions and small identification labels that pop up when you rest the pointer on program icons.

2. Content. Buy CD-ROMs with only the best and latest resource material.

3. Hypertext links to cross-references. If you uncover an interesting fact while searching for information, can you jump to related articles by double-clicking on words in the text?

4. Integration. You shouldn't have to search disc resources individually to locate all instances of a search request. The product should support text string searches and Boolean operators to narrow the search scope.

5. Copy and Paste. Can you copy selected text and pictures to the Clipboard for pasting in another application?

6. Selective printing. You should be able to highlight any part of an article, then print it.

7. Multimedia. Does the reference contain animation, sound, video clips, and photographs? Are multimedia elements indexed separately and easily accessible?

This month, we examine three multimedia general reference tools that combine several information resources on one CD-ROM.

Complete Reference Library

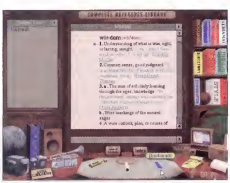
Mindscape's *Complete Reference Library* (CRL) contains 10 major reference works, such as:

- American Heritage Dictionary of the English Language, Third Edition
- Concise Columbia Electronic Encyclopedia
- Roget's II: The New Thesaurus
- Reader's Companion to American History
- Simpson's Contemporary Quotations
- 1994 Information Please Almanac, Atlas & Yearbook

CRL adopts an office metaphor for its user interface. At startup, you see books on bookshelves and several items that you might find on office desktops. Rest the cursor on an object, and a pop-up label identifies its function. Some items, like the camera, speaker, video camera, trumpet, and film strip serve as gateways to an article's multimedia contents. This CD-ROM features thousands of word pronunciations, 1,000 color photographs, 110 musical instrument samples, 50 musical style examples, 215 non interactive color maps, and 75 moving images. All multimedia items can be previewed from the CD-ROM's Media Library.

To initiate a search, type a search word in the Search Topic window. CRL supports Boolean searches using AND, OR, and NOT operators, as well as string searches (when the text string appears in quotes, e.g. "Maya Angelou"). While Boolean searches are quick, text string searches move at a snail's pace. Moreover, the program doesn't always find every instance of a search string request.

A list of search "hits" (finds) appears in a Subject List window. Double-clicking a list entry brings that article into view. Associated multimedia elements can be accessed via the media objects buttons.



The *Complete Reference Library* desktop has several click-on icons, which are identified by pop-up labels.

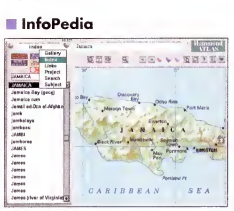
CRL searches for information in "open" reference books. The first time you use CRL, it opens only the dictionary, encyclopedia, almanac, and historical companion. You can have up to 10 references open simultaneously, but you must manually open each one. The next time you launch CRL, it automatically reopens all references that were open when you quit the previous session.

CRL supports hypertext links; double-click a selected word, and other instances of that word appear in the Subject list. You can copy selected information to the Clipboard and print all or selected portions of an article. CRL's Toolbar option (available only from the Program Manager) lets you access CRL information from any Windows application.

CRL is not as easy to use as *Microsoft Bookshelf 95* or *InfoPedia* because program options are not immediately apparent. For example, double-clicking on a CRL book spine doesn't open that book. CRL's multimedia introduction to basic program options is buried deep in the Video Help menu and can't be accessed through a standalone icon or an automatic video presentation. Although there is an index for every resource on disc, only CRL's dictionary, almanac, book of quotations, and style references feature tables of contents.

Complete Reference Library, $49.95
Mindscape
(415) 883-3000

InfoPedia



***InfoPedia* has several search engines or "browsers" to locate information.**

Future Vision's *InfoPedia* (IP) includes eight references:

- Funk & Wagnalls New Encyclopedia (all 29 volumes)
- Roget's 21st Century Thesaurus
- Hammond World Atlas
- World Almanac and Book of Facts, 1994
- Merriam-Webster's Collegiate Dictionary, 10th Edition
- Merriam Webster's Dictionary of English Usage
- Merriam Webster's Dictionary of Quotations
- Webster's New Biographical Dictionary

It's difficult to tell how timely these resources are because full citations are unavailable.

Startup takes you to the program's main menu where icons provide access to articles by alphabetical or subject list, particular words or articles, and multimedia elements. An optional Tour Guide presents a multimedia overview of product features. Infopedia's work screen displays pop-up labels for highlighted objects, but the program interface is not as user friendly as Bookshelf 95. For example, you cannot browse the contents of a particular reference or zoom in on atlas maps.

IP has several search engines for information retrieval. Select Gallery to preview the CD-ROM's multimedia elements, which include more than 150 animations and video sequences, thousands of color photographs, and hundreds of audio clips (including national anthems, but no pronunciations). Choose the Links browser to view hypertext cross-references for an article currently in view. Several articles have no links.

Select All Books from the Index browser to search for information within all IP books. The Subject browser searches for words or topics using Boolean operators. IP does not support text string searches.

A list of search hits displays in a window on-screen. IP abbreviates titles that do not fit the search window but doesn't let you view full titles before selecting them. Curiously, clicking on the Next button does not bring up the next instance of a search hit. Instead, it displays the next title in the currently open reference book. Double-clicking on a word in an article brings up its definition.

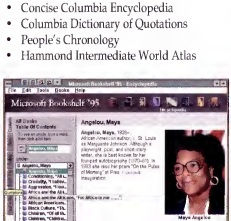
You can copy images or text to the Clipboard and print all or selected portions of an article. A Project feature lets you gather articles on a particular subject and place them in a folder. Some encyclopedia articles include bibliographies of suggested readings.

InfoPedia, $79.95
Future Vision
(914) 426-0400

Microsoft Bookshelf '95

The pioneering *Microsoft Bookshelf* debuted in 1987, providing users with an unprecedented number of resources on a single compact disc. This electronic reference improves with each new release. Bookshelf 95 offers updated versions of eight resources, such as:

- American Heritage Dictionary
- Original Roget's Thesaurus
- World Almanac and Book of Facts, 1995 Edition
- Concise Columbia Encyclopedia
- Columbia Dictionary of Quotations
- People's Chronology
- Hammond Intermediate World Atlas



***Microsoft Bookshelf 95* has a very friendly interface that displays full article titles.**

The Academic Edition also includes a Teacher's Activity Guide with suggestions for classroom use.

When Bookshelf's optional Quickshelf Toolbar is visible, you can click on one of its buttons to access Bookshelf resources from any Windows program. At installation, Bookshelf puts a Quickshelf icon in the Program Manager Startup group so the Toolbar appears automatically on the desktop.

Bookshelf has a user interface that other software would do well to emulate. It displays Tooltips (pop-up labels) for icons. Click-on buttons and tabs (clearly labeled) provide access to program functions. An optional spell checker verifies the spelling of words you type in the text box before you call up articles or search for words, phrases, and numbers. Boolean and text string searches are supported. When a list of search hits appears in the Articles window, you can point the cursor on a truncated article title and see its full title. All dialog boxes have a Help button.

Double-clicking on any word in the article window brings up its definition with an optional pronunciation. Pictures (if any) display with article text. Pictures and text may be copied separately to the Clipboard for pasting in another application. You can print all or just selected portions of article text.

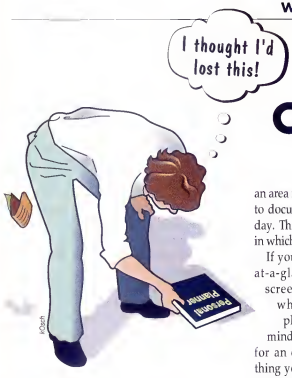
If an article has an accompanying multimedia element, an icon for that clip appears on-screen. Bookshelf features 80,000 spoken pronunciations, more than five hours of audio clips, 3,000 images, 160 national anthems, 230 national flags, and more than 150 animations and video clips. Interactive atlas maps let you zoom in for a closer look or jump directly to related Encyclopedia and Almanac articles.

Address Builder and Year in Review are new to Bookshelf 95. Address Builder helps you locate city/state/ZIP information for any given street. Year in Review presents articles, organized by subject, for newsworthy events, facts, people, and places of 1994.

Microsoft Bookshelf 95, $59.95
Microsoft Corp.
(800) 426-9400
(206) 882-8080

Our recommendation: If you already have an encyclopedia, go with Bookshelf 95. If you want an entire collection of reference tools, choose InfoPedia. If your budget permits, purchase both! ●

by Carol S. Holzberg, Ph.D.



Organizing Your Life

With Sidekick

"Where did it go?" It seems as though those words are heard almost daily out of most people's mouths. If you haven't misplaced your keys, it's your wallet. If not your wallet, then it's your personal organizer.

Starfish Software may not be able to help you locate your keys, but with *Sidekick* for Windows, they are ready to help with the stress of wondering where your organizer has disappeared to.

Sidekick is an extensive personal organizer, but rather than lugging it around with you, it is kept within your computer. After the initial installation, all it takes is a quick mouse click, and you have a planner much bigger than any you've had before.

Conventional organizers tend to have three types of calendars: day at a glance, week at a glance, or month at a glance. You have to choose which one would be most appropriate for your needs at that time, and if you later think another one would better suit you, you have to grab a second bundle of cash to buy a new one. It would be convenient to have all three options whenever you want them, but a conventional planner would be too large if it contained three separate calendars.

Sidekick includes access to all three of these calendars as well as yearly calendars for a retail price of $49.95.

The daily calendar is divided into half-hour segments so, if you desire, you can have nearly every minute of your day recorded. It also has an area for a "To-Do" list and a place designed to document any calls you make during the day. The daily planner even contains an area in which you can list your goals.

If you click on the Weekly tab, the week-at-a-glance calendar will be shown on-screen. Because this calendar contains what you've put into your daily planner, it's a convenient way to remind yourself of what you have planned for an entire week. If you think of something you need to add to a day, click on the day, and you will be taken immediately to the daily planner.

By choosing the Monthly option, you can see the entire month at a glance. This also lists things that you have planned for a specific day. As easily as with the weekly calendar, you can be moved into the daily planner.

But the calendars aren't the only great highlights of this organizer. Sidekick also includes a huge card file that can be used for a business or personal address book or for recording books, videos, or anything you would like to keep a file on. Each card file can keep as many as 20,000 cards. You can document someone's company name, office phone number, or fax number. The card files allow you to add, delete, or make changes to your cards to keep them up to date.

Sidekick has other features that you won't find in a conventional planner. For example, if you want your planner to be private, you can implement a password so you are the only person with access to it. You also can set an alarm that will go off, regardless of whether you are working in Sidekick or not, to help remind you of appointments you might forget.

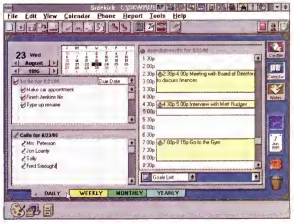
For those needing a little help with the program, Sidekick has "help balloons" that, when the cursor is placed on a button in the toolbar, remind you what each button does. This aspect is a big help, as we found the manual a little difficult to understand. We spent time playing with the program on our own, using the help balloons often.

Sidekick puts into an organizer more than you could carry with you, without the worries about misplacing it. Many say that if they lose their planner, their life will come to a halt, as it is the only way they know what's going on in their life. Sidekick eliminates the fear of losing your daily activities because you always know where to find it. Starfish now needs to develop a way of keeping our wallets on the computer so we don't have to worry about misplacing them. ●

by Kirsten Bernthal

For More Information:

Sidekik for Windows
Starfish Software
(800) 765-7839
(408) 439-0942



With *Sidekick*, you can schedule appointments at half-hour intervals, make To-Do lists, and keep track of phone calls you need to make.

Avery Colors™ Fluorescent and Pastel Laser Labels

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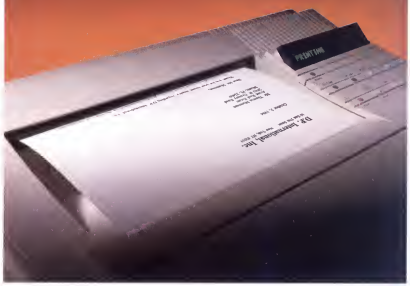

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Mac vs. PC

Which Computer "Make" Is For You?

Unfortunately, buying a computer is not as simple as waltzing into your local computer electronics store and picking out the best-looking system. Before you buy, you need to make some decisions about what type of system best fits your needs. The first and foremost of those decisions is what "make" of computer you need—an Apple Macintosh or an IBM compatible.

It all started back in the late 1970s, when computer components came in pieces and parts (assembly required). Two computer enthusiasts, Steve Jobs and Steve Wozniak, formed a company called Apple Computer and put together a computer that didn't come as a kit. You could take it out of the box, plug it in, and use it without knowing how to wire in a keyboard or install memory. The systems were the first of their kind, packaged and priced so they would be more attractive to a consumer market rather than the corporate market. The Apple II was such a hit that the company's first-year sales were $2.7 million.

It didn't take long for other companies to notice Apple's success and to create their own versions of the desktop computer. International Business Machines (IBM) introduced its version, the IBM PC (personal computer), in 1981. But IBM did not create its PC to work with the Apple computers. Instead, the IBM computers were made with a different architecture and different foundation software.

At that point, the industry went through a major shift. Most companies realized they couldn't compete with IBM's already established worldwide market. They guessed that IBM's technology would become the standard, and began designing their own compatible computers that would operate the same software as the IBM PCs.

But Apple didn't give up. In 1984, the company introduced the Macintosh, one of the first real consumer-friendly computers. These systems had a graphical interface instead of the complicated commands and codes necessary to operate IBM and compatible computers. Apple decided to go it on its own; it had already established itself in the personal computer market.

And so the personal computer market is still divided. On one side is Apple, with its user-friendly computers, and on the other is the IBM and compatible computers, with the lion's share of the market. How do you decide? That's the big question that we hope to help you answer. Here we'll compare the two and explain your options.

Brain Power

One of the major differences between the two computer "makes" is the type of microprocessor they use. The **microprocessor**, or **central processing unit**, is a microchip that handles all the main processing functions of the computer, making it a lot like the computer's "brain."

IBM and compatible computers (generally referred to as PCs) use microprocessors manufactured by Intel, and increasingly AMD and Cyrix. These chips have names like the 386 and the 486, although today's most popular, the 586, is called the Pentium. All Apple Macintosh computers used microprocessors made by Motorola. You could find Macintosh computers powered by chips like the 68030 or the 68040.

Nowadays, however, Apple is shifting its desktop systems away from the Motorola chip to another microprocessor called the PowerPC. Almost two years ago, Motorola, IBM, and Apple introduced this small, high-performance chip. (These chips are referred to as the 601, 603, or 604.)

What difference does the microprocessor make to the buyer? It's hard to really measure the microprocessors currently available. They are comparable in power and speed.

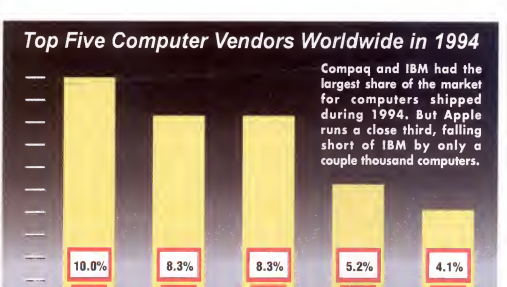
There is one feature of the PowerPC that makes it special. Because Apple and IBM were involved with its development, this chip is capable of running DOS/Windows on PCs, as well as System 7 on Macintosh computers. (DOS and System 7 are the operating systems for the two computer makes.) That means if you purchase a PowerMac computer from Apple and it's a DOS-compatible computer, it can run both Macintosh and Windows applications at the same time. Is that enough to sway your opinion one way or the other? We'll discuss it in more depth later.

"Ease Of Use"

A big catch phrase in the computer market is a product's "ease of use," how hard it is going to be to learn and how long it is going to take. It's no big secret that Apple's System 7 operating system has the clear lead in this case.

Richard Zwetchkenbaum, research director at the market research firm International Data Corp., says the Macintosh platform always has had better ease of use and is easier to adapt to than Windows and DOS.

The Macintosh interface is all menus, icons, and windows. Documents are represented by icons that look like pieces of paper. Directories look like folders so you can store similar things



*Courtesy of Dataquest

together. There's a little trash can that plumps out when you have deleted a file. And it doesn't totally delete until you "empty the trash." There's no need for a special file managing application. To perform tasks like moving or deleting a file, you drag and drop it to a new location. You even can see file statistics (like the date it was made and its size) in a window. There's a built-in tutorial and one mouse button to make everything simple.

In terms of navigating the environment, moving data, and moving between applications, Macintosh wins hands down.

The Macintosh also wins when it comes to system setup. Because Apple is the only manufacturer of systems and hardware extras, there's not a real problem with compatibility. Want to add a CD-ROM drive to your system? Plug it in and the system automatically recognizes the drive and it's ready to go. Want to add more random-access memory (RAM)? Just plug the memory chips inside and you've got more horse power.

Try that on a PC and see what happens. Because there are many companies making drives, modems, memory add-ons, and so on, not everything works together quite so easily. You first have to make changes in your computer's startup files so it can locate the new components and communicate with them.

Apple's lead has diminished over time, Zwetchkenbaum says, because the Macintosh interface has not advanced to the degree that the Windows interface has advanced. Windows is very similar to the Macintosh interface. It has the same sorts of menus, icons, and windows. It has a built-in tutorial and some drag-and-drop options. But the Windows interface isn't as clean and simple as the Macintosh, mostly because you have many more options and built-in features. It has more extras, like a built-in calculator, card file, and calendar. In essence, it can't look as simple because there's a lot more to it. It also depends on DOS as its foundation software. This is somewhat limiting, because when you name files you are limited to an eight-character name, with a three-character extension.

A lot of IBM-compatible vendors are making the Windows environment even easier to learn, says Richard Corpuz, industry analyst in personal computing at Dataquest. Take, for instance, Packard Bell, IBM, and Compaq to name a few. They are creating custom shells that run on top of Windows. When you start your new Packard Bell computer, for example, the Navigator 2.0 lets you choose to work in a more familiar, three-dimensional environment, such as an office study or kid's room. Besides giving the computer a homey environment, the Navigator also lets users watch tutorials and provides easier access to software programs and organizing and managing files.

Or, consider how Microsoft Corp. is making the environment easier for the novice. The company recently introduced an even homier program that runs on top of Windows, called *Microsoft Bob*. Instead of operating from a group of windows, you work in a virtual room, such as an attic, study, sunroom, or garage. Then a "guide," maybe an on-screen dog, cat, dinosaur, or bird, helps you navigate and accomplish your tasks.

And who can forget the much-anticipated Windows 95? When this operating system comes out, supposedly in August, it will run faster applications than Windows 3.1 could. It will combine file managing functions in the main screen, just like the Macintosh interface, and will have icons that look like what they represent: documents, spreadsheets, and folders. There's a recycle bin that operates like the Mac trash can and an AutoPlay feature that lets you automatically play CD-ROMs without having to install files and directories on the hard drive (just like the Macintosh).

In addition, there are new options only in Windows 95, like the a Quick View feature that lets you peek at a document without having to fully open it, or a Taskbar that lets you click a button to instantly bring up a program that is running or minimized.

PCs are also making strides towards "plug-and-play" peripherals. When Windows 95 comes out, you will be able to plug a printer, modem, or hard drive into a PC and be able to work with them automatically. The software will do all the configuring. All you need is a computer that is plug-and-play-ready, and your peripherals must also be set up for the plug-and-play standard.

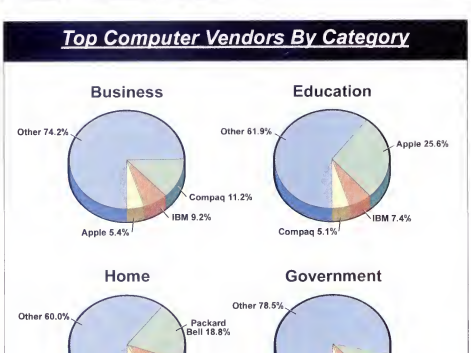
Virtues In The Architecture

If you talk to friends, relatives, or co-workers before you make a computer purchase, they will probably tell you that Macintosh computers are built more for design, graphics, and desktop publishing, the kind of work done at newspapers or graphic design companies. They also may tell you that PCs are better suited for more advanced mathematical applications, such as spreadsheets and databases.

But is it the truth? Not really.

The idea that the architecture of a Macintosh or a PC would make one better at a task than another is more of a perception than a fact of life, says Michael Reiter, spokesperson for IBM.

"I think that there are strong marketplace perceptions that people have and that they attach to particular brands," Reiter says. "This



IBM-compatible computers lead the market according to the number of computers shipped during 1994 in the business, home, and government markets. Apple, however, still reigns supreme in education.

brand is a good bargain, this brand has the best service, and that brand is easier to use. Those are perceptions as much as anything you could actually measure."

Bruce Gee, Apple product manager of entry-level Macintosh systems, agrees.

"If you look back historically, the Mac started as a graphical user environment," he says. "I think this perception of why Macs are good at graphics and PCs are good at numbers is that the Macintosh has a graphical user interface and it's a natural environment for desktop publishing, design, and artwork."

The PC, on the other hand, is perceived as being good with numbers because it started with DOS' character-based environment. Databases and spreadsheets are more character-based environments.

Based on these perceptions, the graphics and design worlds have seemed to take more to Macintosh computers, while PCs are more accepted by businesses.

You still can do design or graphics on a PC, just as you can do calculations on the Macintosh. Whether you get better science and math capabilities or better graphics on one system versus the other actually has more to do with the power of the microprocessor, the memory, and other hardware extras.

On The Shelf

Peruse the hardware section of any computer section and what do you see? More than likely there'll be rows and rows of IBM and compatible computers and only a few Macintosh computers.

So goes the personal computer market. According to International Data Corp.'s research, the number of PCs in the 1994 market dwarfs the number of Macintosh computers. The number of brand-name computers shipping in the United States in 1994 was 18.2 million. Of those 18.2 million, 88.1% were Intel-based, one of the most popular PC microprocessor makers.

And that's only the number of computers *shipped* last year. When you consider the total number of installed computers in the U.S. during 1994, PCs still dominate. Of a total 75.9 million computers in the U.S., about 82% were Intel-based. Only 8.6 million, or about 11%, were based on the Motorola 680x0 microprocessor, which Apple primarily used in its desktop computers.

The same goes for software. According to the Software Publishers Association (a trade association of the software industry), 65% of the software sold in the United States and Canada in 1994 were Windows applications, with sales totaling about $4.78 billion. Macintosh applications equaled about 17%, with sales of about $1.25 billion.

It all adds up to the fact that there are more PCs available and more software programs available and sold to run on them.

The reason, Zwetchkenbaum says, is that there's a larger market of PCs for software developers to market their software to, creating an economic incentive for them to create products for Windows. In fact, he says, that's probably the primary advantage to the Windows environment.

Back when Apple decided to go up against the IBM platform, the company did not release the specifics or license other companies to create Macintosh-compatible computers, Corpuz says. While the company may rate in the top 10 of most computer markets (see chart on this page), it's surrounded by PC manufacturers.

Recently, Apple licensed a handful of companies, such as Radius Inc. and Power Computing, so they could use the Macintosh hardware and operating system and create Macintosh-compatible computers. While Radius seems to be creating computers for a high-end graphics/desktop-publishing market, Corpuz says Power Computing is gearing up for the consumer and small business market with systems that have lots of bundled software and very competitive prices.

Although it's too early in the game to see what will happen, Corpuz says this should help to spread the acceptance of the Macintosh computer and increase sales. And that should, in turn, create a larger installed base, persuading more software developers to create applications for the Mac in the future.

What It's Going To Cost

With all the competition in the PC market, price wars are bound to arise and drive costs down. On top of that, every IBM-compatible company doesn't have to put a great deal of profits back into research and development because they aren't the only manufacturers out there, unlike Apple. So when you compare

Head To Head

PowerMac	PowerMac DOS compatible	IBM Or Compatible Computer
Advantage: Easy to use interface; best for multimedia because it doesn't require CD-ROM programs to install themselves and has built-in sound; most popular interface in schools; high usage in desktop publishing and graphics design industry. **Disadvantage:** Higher priced; only a handful of vendors manufacture the computers; not as many software products available to choose from; fewer units found in corporate businesses. **Ideal user:** Home user with children who will use the computer; graphics design and desktop publishing businesses.	**Advantage:** Same as PowerMac; can run both Macintosh and PC software titles. **Disadvantage:** Even higher-priced systems and upgrade packages. **Ideal user:** A family willing to pay a premium so parents can bring work home and run applications in the Windows environment while the kids can use the Macintosh side; a small business person who wants the simplicity of the Macintosh but yet needs to operate one or two business programs not available on the Macintosh platform; an office that has both computer "makes" and wants them to work together.	**Advantage:** More competitively priced systems; larger number of software titles available; substantial usage in the corporate and business market. **Disadvantage:** Setup and installation of peripherals and CD-ROM programs still not as easy as plug and play. **Ideal user:** Home user wanting access to a large number of software titles for entertainment, education, and finances; business user who wants to be compatible with others in the office or industry.

prices, you will find that IBM-compatible machines are a little less expensive.

When we went comparison shopping, we started with the Macintosh Performa 6115CD, which has a PowerPC processor operating at 60 megahertz (MHz), eight megabytes (MB) of RAM, a 350MB hard drive, a fax/modem, a double-speed CD-ROM drive, speakers, monitor, and lots of bundled software for about $2,400. A comparable Packard Bell Pentium computer running at 60MHz with a 420MB hard drive, 8MB RAM, monitor, software, and all the multimedia components, cost about $1,700.

Power Computing offers some attractive Mac-compatible systems priced about 10% to 15% less than a comparable Apple computer. They include quality software, but are being sold directly from Power Computing instead of through a computer store. For example, a Power 80 system running at 80MHz, with 8MB RAM, a 340MB hard drive, and bundled software will cost about $2,000. When you figure a couple hundred dollars more for a quality monitor, that's not bad.

The Power Computing systems are a little more powerful than you might find at your average computer store. While you may pay less than you would with an Apple computer, keep in mind you are taking a small risk investing in a system by a company that hasn't been around long enough to prove itself in this market.

Mac, DOS, Or Both?

When you add it up, the Apple Macintosh is a friendly, easy-to-use computer that's great for kids or adults wanting to use a lot of multimedia or use the PC for school. It's a little more expensive, but you're paying for the simplicity.

On the other hand, there are many PCs in the market driving down the prices, and there's a lot of software available. The operating system is becoming easier to use, and may even become as simple as the Mac with the release of Windows 95. In addition, people who take work home or work from home more than likely will work on a PC since Apple has yet to really crack the corporate market.

Then again, the PowerMac DOS-compatible computer, which can be purchased as a system or as an upgrade board for PowerMacs, can operate Macintosh and DOS/Windows programs at the same time, and even can switch between the two.

Although the PowerMac DOS-compatible sounds like it's the computer to end all others, you pay a heavy price for it. The expansion board and software to upgrade an ordinary PowerMac runs about $700, while the already-equipped PowerMac 6100 DOS-compatible operating at 66MHz costs about $2,760.

The PowerMac will run your Windows software at the speed of a 486DX2 at 66MHz, which is a far cry from a faster, 90MHz Pentium costing a little more than $2,000. So it's not likely you will be buying a PowerMac if you primarily want to run DOS/Windows or Windows 95.

So who would use a PowerMac DOS compatible?

"The type of buyer that would buy a PowerMac with DOS compatibility is one that is committed to the Macintosh platform but has a certain degree of requirement to be in the Windows environment," Zwetchkenbaum says.

Consider This

So what should you choose? First, you have to consider what you are going to use this computer for.

"I think one of the biggest mistakes people make is that they come at this from the back end, which is to say they have in mind a particular name of a particular chip speed when they shop," Reiter says.

The way to approach it, he says, is to figure out who is going to use the computer and what they want to do. Then head to the software store and see what programs are available that fit those needs. Are they IBM and compatible programs, and are they also available for the Macintosh?

Remember that you will probably be using a computer at work and will want to take work home or share files with your computer at work, Reiter says. Your kids will most likely use a computer at school and will be familiar with that interface and may possibly want a home version of the software they use at school. You also may want to exchange information or diskettes with family members or friends.

Take heart. There's no right or wrong answer, Reiter says.

"It's what you want to use the computer for. If somebody says, 'Oh, you made a mistake,' it's not a mistake if it meets your needs." ●

by Cindy Krushenisky

Kids Plus Computers Equals New Learning Combination

Back in the corner of your parents' basement is a dusty box of remnants of the building tools you once played with. Maybe it's Legos, Lincoln Logs, or that bucket and pail you used in the sandbox. Throughout the years, some of the best toys are the ones that let children use their imaginations to create and build.

The computer is a shiny new "toy" becoming more common in our society. With its ability to change at the user's whim through new software, the speed at which it can work, and the entertaining extras of sound, video, and animation, PCs have captured our utmost attention. The sales of home personal computers exploded in 1994, reaching 33% of American households in early 1995, according to a recent study by the Software Publishers Association.

For those of us with access to computers, they have changed the way we do things—the way we communicate, the way we organize our thoughts, and the way we entertain ourselves. But what can this expensive toy do for our children? Can it help them think better? Are kids and computers really a good mix?

Mixing It Up

Douglas Clements, a professor of early childhood at the State University of New York at Buffalo who has done several studies and written three books on kids and computers, answers with a resounding "yes." The computer is not just another learning tool, he says, but a tool that can open new avenues of learning to enhance a child's creativity and higher order of thinking.

Clements' research uses a programming language called Logo that involves a small on-screen turtle. Children "program" the turtle by telling it how many steps it should take to get to a berry and get more energy. If it takes one step, then one step, then another step, and so on to get to the berry, it will burn up all its energy by the time it reaches its food. But if the child can figure out that the turtle should automatically take 20 steps, or 10 steps one direction and 10 steps another, the turtle will reach the berry faster and burn less energy. Through this entertaining medium, children learn to add and subtract without realizing they're using mathematics.

Some educational critics argue with Clements' findings, following the thinking of Swiss psychologist Jean Piaget that young children learn through interaction with concrete materials and people—that they can touch. Computers, they say, are not concrete.

Clements argues that concrete doesn't necessarily mean you can feel the images in the computer as may be the literal interpretation. Clements' research shows that preschool-aged children do understand what they are doing with the computer, and, in that sense, it's concrete.

"To you and I, nuclear physics isn't concrete and never would be. Quantum particles are just words to me," Clements says. "But even to a nuclear physicist who has never seen a quantum particle, it is very real. They know and understand and see reality through those lenses."

There is evidence he's right. A study commissioned by the Software Publishers Association (SPA) and Interactive Educational Systems Design Inc. called the "Report on the Effectiveness of Technology in Schools, 1994-95," seems to back up his research. The study is based on the findings of 133 independent research projects from educational and scientific publications, including the *American Educational Research Journal*, the *Journal of Educational Psychology*, and the *Journal of Computer-Based Instruction*. The report indicates that the use of technology in schools will result in a better-educated and more productive workforce. Students in the study responded more effectively to software that offered them a sense of control over the learning environment, aroused their curiosity, used multiple levels of difficulty, provided feedback, and included an element of fantasy or animation.

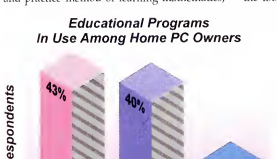
Part of computers' appeal, says Jan Davidson, president of the educational software company Davidson & Associates, is that they allow children to get involved and become active learners. That's why she became interested in computers in the first place.

"As a teacher in the 'old days' before computers, my biggest challenge was how to turn my students into active learners," she says. "If they were participating, they were learning. You had to be sure they weren't just daydreaming about something else or doing something else."

The computer makes the transfer from passive to active learning, because it lets kids learn at their own pace. It also shows things visually and provides instant feedback that's unavailable in a large classroom. And there's fun and animation mixed in to

keep it entertaining, almost making children forget they are learning.

Altogether, computers can create a positive experience. And success breeds success. For instance, if a child is exposed only to the drill-and-practice method of learning mathematics,



A recent survey by the Software Publishers Association found that 40% of those surveyed owned between four and10 educational programs at home.

that's what the child will think math is all about. A child would learn to use prescribed methods dictated by someone else to get the right answer. But computers can change that, Clements says. Children can use entertaining puzzles and programs that make math fun, so they want to learn. When children get the answer right through their own methods, it gives them a sense that they can do it. And that success breeds more success in the subject.

So computers can change what a child has been taught to believe about a subject. They also can create a richer understanding of a topic. When Clements applies his turtle/Logo approach to other areas of mathematics as students design shapes and other objects using multiplication, geometry, and proportions, they see the connections among the various topics of mathematics, he says. Therefore, they get a better feel for numbers and reasoning.

When To Start

Educational benefits aside, Sally Bowman Alden, executive director of the Computer Learning Foundation, says the computer is really the tool of our children's day.

"It's just like our parents bringing encyclopedias home when we were 4 and 5. That was the tool of our day. Online encyclopedias and CD-ROM encyclopedias are the tools of our children's day," Alden says.

With these new tools come new skills. Children must learn to organize a search for information electronically and determine what information they find is good and what is junk.

"The younger we introduce our children to the tools of their day," Alden says, "the more proficient they will be at using them throughout the different stages of their life."

But how young should children be when the introduction occurs? A quick tour of a software store reveals there are programs available for children as young as 6 months old. Should you start that early? There also are people who argue that children should wait to use computers until children reach the early teens and their cognitive learning has developed. Should you start that late?

The majority of educators, researchers, and parenting organizations seem to think otherwise. The general consensus shows that children about 2-1/2 years old can use computers.

Warren Buckleitner, editor of the *Children's Software Revue Newsletter*, says introducing your child to the computer is a gradual process. It starts when children notice this new machine and become interested in it, its buttons, and its bright lights. Eventually they will make the association between the cause and effect of mouse movement and the on-screen cursor and typing letters into the keyboard and their appearance on-screen.

Every child is going to be different, Buckleitner says. Some kids are 3 or 4 years old before they are interested. Some children might even be a little apprehensive or afraid of the computer. In that case, you should never push your child. Instead, entice them into using software they are interested in.

"For instance, if they hate computers but love the 'Lion King,' guess what the Lion King CD is going to do. The key is to expose them to the possibilities," Buckleitner says.

The Possibilities

If you've recently browsed the software shelves of your local computer store, it's likely that you were barraged with new educational products. That's not surprising. According to the SPA, the use of home educational software has increased almost 50% over the past year.

The Right Software For Your Child's Developmental Stages

2-3 Years Old—Children should be introduced to the computer. Parents are advised to let children use the mouse. Most can master it by age 3. Point-and-click programs that let the child make things happen are best.

Preschool—Parents can start to take advantage of some of the programs for this age group that let children learn shapes, sizes, and so on. Programs should still use a mouse or one or two keys on the keyboard. Programs should let them take control and do simple decision making. A drawing program is recommended to build creativity.

Elementary—Children can handle more problem solving and abstract concepts, so they will enjoy many of the adventure/learning programs available. They also should have a child's word processor and some sort of drawing program. Children can support subjects learned in school with quality programs available for home use. Children may begin exploring online services.

Preteen and Older—Children will continue to use the computer as a tool, so they will want an adult word processor and other reference programs for homework use. School subjects still can be supported at home. Online usage may increase. Children are encouraged to use programs that challenge them to form their own hypotheses and deduce their own conclusions. ●

But not every educational/learning program is right for every child. Children are responsive to different types of learning methods at different ages. You wouldn't plop a multimedia encyclopedia down in front of a

2-year-old, just like you wouldn't give a 13-year-old a beginning storybook program such as *Teddy's Big Day*.

In those early preschool years, children need programs that use mostly mouse operations and don't require any reading. You want programs that have a lot of child control, Buckleitner says, and you want some simple decision-making, Clements adds.

For instance, Broderbund's Living Books series of programs, such as *Just Grandma and Me*, puts the child in the driver's seat, says David Katzner, president of the National Parenting Center. Children "turn" the pages as the story is read to them. Children even can click on-screen objects to make starfish dance or umbrellas rocket into space. Edmark's *Millie's Math House* lets children play with numbers and learn sizes and shapes by clicking the mouse. It is also a good idea to include a drawing program in preschoolers' software libraries to let them exercise creativity.

When children reach elementary school, the computer still can be fun, but with a few more challenges. At this age, children are starting to use more sophisticated problem-solving and can handle abstract concepts such as numbers and relationships. They are ready for programs such as *Scholastic's The Magic School Bus Explores The Solar System* by Microsoft, which lets children follow clues as they learn to track down the missing Ms. Frizzle. Elementary children also will be using the computer more as a tool, Buckleitner says. They will use a child's word processor to compose and develop their ideas and create cards and signs with drawing programs. At this time, kids also should be using a variety of programs that are "school-side out," Buckleitner says. Anything kids learn in school can be supported with quality software at home.

Preteen and older kids start to develop their own hypotheses and deduce their own conclusions. At this age children should be using programs like *The Incredible Machine* by Sierra On-Line, Katzner says. It presents challenging puzzles that make kids really think. For instance, a child is presented with a basketball on the left side of the screen and a lightswitch on the right. The assignment is to turn that lightswitch on. The child can use other objects, such as a trampoline, ramp, tea kettle, candle, and so on to create a chain effect of things bouncing off one another until the light is switched on. Clements says you want older children to take increasing control over the computer and increasing responsibility for making software work. Instead of enjoying a highly animated game, for example, Clements wants to see kids creating their own animation.

That doesn't mean all software titles you choose should be strictly educational. You still want to make sure using the computer is fun and engaging.

"It's that same old question of 'Should we watch National Geographic specials or should we watch the Simpsons?'. There are hard choices," Buckleitner says.

Buying Tips

With all the educational titles available, you can afford to be picky when software shopping. So before you go browsing the shelves:

- Know your hardware and what will operate on your system.
- Check magazine reviews of children's software, and look for seals of approval by parenting and educational organizations.
- While you may want to shop with your child for software, be wary about letting the child pick the program. They may be more apt to go for packaging than content.
- Look at your child's learning style. Does he or she like rapid-paced learning games, or does the child prefer problem-solving games that require days of activity?
- Check with the child's teacher and see if there are any areas in school that he or she may need a little more help with or that the child might need to build confidence in.
- Are there any areas of interest or hobbies your children enjoy? For instance, do they like music, outer space, or sports? There are programs that can promote those interests.
- Finally, look for a guarantee and make sure you can return the product if it doesn't work on your computer or your child doesn't like it. ●

Buckleitner recommends that parents get a mix of educational and entertaining programs. If parents buy just the learning programs, few children will want to use the computer without a lot of intervention, Clements adds. Many programs, however, let you have your cake and eat it too by mixing entertainment and education. Take *Where In The World Is Carmen Sandiego?* by Broderbund, for example. The infamous Carmen and her gang are stealing the world's greatest treasures, and children must track them around the world to return the treasures. As children travel and follow clues, they learn about geography and other cultures and people. Children are learning, but they don't care. It's fun.

Spend A Little Time

Even with the right software tools, the computer can mean little for children if the tools aren't used correctly, Clements adds.

"The computer should be seen as a parent-child activity," Clements says. "It's not a kid-sit-alone activity, in which you tell them to go do their computer and learn to be smart."

The amount of parent involvement will vary with the age of the child and the type of the program. A younger child may need more of a parent's time to show them what they can do and to praise their work, while an older child may need a parent to put some time in at the beginning to introduce the program and then fade out as the child takes more control.

The amount of time a child should spend at the computer also varies. The best rule of thumb is to monitor whether your child is actively involved in what is going on. If they're actively learning, you don't need to be too concerned. But when they start to "zone out" and become more passive, it's time to suggest they play outside or do something else, Katzner says.

Don't worry; the computer is not going to turn your child into an antisocial loner. Studies show that kids prefer social use of the computer, Clements says. They even do better. Parents and friends should be encouraged to join in. Sure, you'll always hear about the solitary, friendless kid using the computer. But in most cases, Clements says, such children were solitary kids in the first place, and the computer gave them something to do. ●

by Cindy Krushenisky

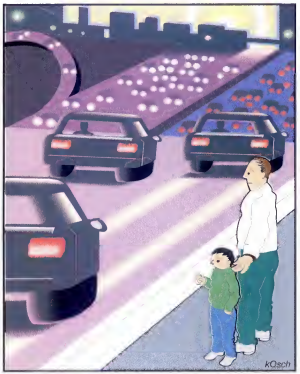
wouldn't it be nice to buy a COMPUTER from someone WHO'S down-to-earth?

If it seems like you need a degree in physics to find the right *computer*, then maybe it's time you shopped Sears Brand Central. Where you'll meet patient, *knowledgeable* salespeople who can help you figure out exactly what you want. And explain it all in plain English, without the *technical* talk. Whether you're a chess fiend, gourmet cook or astronaut in training, you'll find row after row of software for the whole *family*. In the latest formats, from multimedia CD-ROM to Pentium. Plus top-name systems like Apple, Compaq and Packard Bell. Computer shopping can be complicated. So shoot for *Brand Central* and keep it simple.

SEARS

Technological Have Nots

Are Some Left On The Shoulder Of The Info Superhighway?



At Belvedere Elementary in urban Omaha, Neb., Brenda Rotella's class shares one computer with four other kindergarten classes. The outdated Apple computer uses simple software that teaches the alphabet and number recognition. With only one computer, the students are forced to take turns using the computer during "center time." For the last four years, Rotella's wish list has included more computers, but, she says "the funding just isn't there."

A little more than a two-hour drive from Omaha, Pat Caporale of rural Wymore, Neb., uses her computer to connect to America Online at a high price. Every minute online is precious as Caporale has to pay a long-distance fee because her small community doesn't have a local-access number to the service. Sure, she'd use it more if she didn't have to pay long-distance. There's lots of areas she'd like to explore online, but at about $7 extra an hour, she doesn't stay on too long.

You might say that Rotella and Caporale have been left standing on the curb of the Information Superhighway. But they aren't alone. Computers may be one of the greatest learning tools available, but with systems costing between $1,500 to $2,000, PCs are out of reach for many schools and consumers.

This means that some people may not get to use the same learning resources as others, hindering them from developing needed computer skills. These same people won't have access to the illustrious Information Superhighway of the future that will connect everybody, everywhere. When it was simple text you could read and download, the ordinary phone lines would do. But now with video, sound, and other multimedia features, more expensive high-speed lines are needed to link up. Until it's profitable for telecommunications' companies to universally connect consumers to that kind of service or lines, some will be left out in the cold.

Are we creating a nation of technological haves and have nots?

We could be. Not only can computers help the learning process, but by 1997, companies will want almost all of their employees to have computer skills, according to a survey of North American businesses conducted by The Olsten Corp. of Melville, N.Y. In addition, these same businesses are cutting back on formal, in-house computer training.

Tomorrow's business employees had better come prepared. But just how much help should we (or the government) supply? That's the big question.

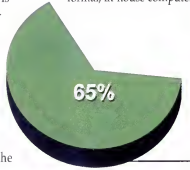
Concern is growing about access to computers. States are creating technology councils, grass-roots organizations are forming, and Speaker of the House Newt Gingrich even has suggested that tax credits be given to consumers buying computers.

Concern is also growing about access to the lines that would link Americans to the Information Superhighway. Legislation is letting phone companies and cable companies compete so they will rapidly lay expensive fiber-optic lines or other type of cabling that can quickly transfer information. The concern goes all the way to the top. Following an executive order by President Clinton, the National Information Infrastructure (NII) Advisory Council was formed in early 1994 to explore such a communications network.

No one is questioning if everyone should have access to new technologies, but rather, how soon and who should have to pay for it.

What's The Big Deal?

Computers have infiltrated just about every aspect of our society. You can find them in homes, in classrooms, on the job, and even at the grocery store check-out line. They are calling this the Age of the Computer. Computers can make calculations and perform many information-based tasks faster than hundreds of humans working together. And if you've ever used an interactive encyclopedia on CD-ROM with its sound, video, and animation, you know it's hard to go back to using the old hard-cover version.

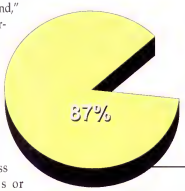


Financial Success

A recent survey entitled "The National Computing Survey," released by Microsoft and IntelliQuest Inc., showed that of 2,800 Americans surveyed, more than 65% say they need computer skills to achieve financial success.

We're also living in the Information Age and supposedly will soon be riding an Information Superhighway. This communications network promises to change the way we live, learn, work, and communicate by connecting us with other people, schools, hospitals, libraries, businesses, and governments.

What does that mean? Officials envision that besides being able to choose from hundreds of channels of television and videos "on demand," we'll have vast information and resources at our fingertips. We could use research resources anywhere in the country and discuss what we found with someone across the nation. Doctors could access our medical records or contact our family physician if we get sick while away from home. With everyone connected, the opportunities seem endless.



At The Office

Almost 87% of Americans surveyed in a study by Microsoft and IntelliQuest believe someday, all work will involve computers.

But if only wealthy households make up the almost 30% of Americans who have computers and if access to an information infrastructure is only wired to businesses and affluent neighborhoods, the gap between those with money and education and those without becomes greater.

The issue is really the knowledge of computers and how to use them. It's learning to find the information that lets you get a job, make more money, or have opportunities that someone without the knowledge may not.

Secretary of Commerce Ronald H. Brown wrapped it all up when he said, "We need to reach out to the 'unconnected' and include them in the Information Age so that they will see technology not as a barrier to prosperity, but as a key to jobs and economic success."

Making In-Roads

When it comes to computer access, many organizations see our public schools as the answer. Davidson & Associates President Jan Davidson, who also serves on the California Governor's Technology Council, says schools could serve as community centers for children and adults alike who may not own a PC. In fact, Davidson says the Council has been preparing a report that recommends schools be kept open in the evening and early morning for the community to sharpen their computing skills and access services such as the Internet.

Sally Bowman Alden, executive director of the Computer Learning Foundation (a nonprofit organization with the goal of giving children access to technology), says that having school computers "asleep" at night, on weekends, and on vacations when they could be available to the public is tragic.

"When schools let out, we've never had a problem making those doors open for sports. And we can make them open and available for technology access for kids if we deem it important," Alden says.

In addition, Alden says community centers and libraries should make computers available, and she's not alone. Numerous people say that public access is the spirit of the public library, and there's one in nearly every town. Anyone could sign up and use computers there. Perhaps the community would be able to connect to the Internet or check out software like they would a book.

Several states have taken matters into their own hands. They've installed public-access kiosks in locations such as shopping malls and grocery stores. For example, kiosks made by North Communications allow Texans to tap into information such as a current list of employment opportunities in state agencies, unemployment benefits, and child labor laws. In the future, the kiosks even may be used to allow citizens to pay parking tickets, register vehicles, order birth certificates, renew driver's licenses, apply for jobs, or file unemployment insurance claims.

A few neighborhoods are putting the idea to work at community centers. St. Bernadine's Head Start Center in Baltimore, Md., teaches computers to children who are enrolled in the program as early as age 3. Sheila Tucker, director of the center, says students ages 6 to 12 also can attend a summer computer camp that emphasizes math, science, and reading comprehension. But the center doesn't stop with the children. One of the missions of the Head Start program is to empower the parent to be economically self-sufficient and to be the primary educator of the child, Tucker says. So the center offers a variety of adult classes at different learning levels not only to Head Start parents but also to members of the community. In fact, there's so much interest in all the programs that the center's classes have waiting lists to get in.

Infrastructure Potholes

Barbara O'Connor, chairwoman of the Alliance for Public Technology, professor of Communications, and director of the Institute for the Study of Politics and Media at California State University, Sacramento, also advocates the use of computers in schools, libraries, and community centers. But she says there's one small glitch to implementing these ideas right away.

Schools aren't getting the technology or funding they need to keep up, O'Connor says. According to a recent survey by the American Electronics Association, a higher level of technology deployment was found in kindergarten through 12th grades than is commonly believed. But much of that is in administrative

Information At Your Fingertips

Almost 90% of Americans surveyed in a study by Microsoft and IntelliQuest thought computers have made information more accessible than before.

support services. The survey showed that technology deployment lags where it's needed most—in the classroom. Schools don't have the money to shift over to classroom technology, O'Connor says, and with the budget cuts currently taking place in Congress, it doesn't look promising.

In addition, the $65 million slashed from the education technology program by the House Appropriations Subcommittee on Labor, HHS, Education, and Related Agencies gives the message, "Kids, you're on your own," according to U.S. Secretary of Education Richard W. Riley.

There's simply no real data that says schools can do business differently by completely shifting over to technology, O'Connor says. Most of the projects that use computers as teaching tools have been treated as pilot programs, she says, with sporadic labs that hit a grade level or two. But systematic change only can happen when we show that everyone can hook up to the Information Superhighway and start doing business differently.

Another problem arises when you consider the special fiber-optic lines needed to bring us the Information Superhighway of the future. It's not profitable for telephone and cable companies to place the lines through poor or rural areas, schools or no schools. To make up for the high cost of laying these expensive lines, the companies will first want to place them in business districts and wealthier urban areas. There the lines will presumably get more use and eventually return some of their expense.

If the Superhighway is really going to turn into a National Information Infrastructure (NII) that'll make large systematic changes in our institutions, as Vice President Al Gore projects, everyone needs to be online. If we're going to improve how health care and education work, take classes from home via computer or television, and get long-distance medical advice, everyone has to participate.

"There's no history to indicate that the market is going to voluntarily serve low-density rural, suburban, or inner-city areas because it is not lucrative enough in a cherry-picking environment," O'Connor says.

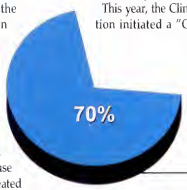
The fear is that schools in wealthier areas will get access right away, but it may be 10 to 15 years before other areas get the access.

The solution? O'Connor suggests tax incentive and federal and state policies that ensure everyone has an on-ramp.

Who Rides To the Rescue?

Government, led by Gore and the Federal Communications Commission, is supportive, O'Connor says.

This year, the Clinton Administration initiated a "Get Connected" campaign to educate Americans and ensure they understand how communications technologies can affect their lives.



Getting Ahead

More than 70% of men and women say computer use is essential to getting ahead at work, according to a recent survey by Microsoft and IntelliQuest.

But how much should the government get involved, especially when the money just isn't there? Telephones and electricity were once new technologies that eventually spread throughout the nation with a little help.

"No one's really arguing that the government should build (the Superhighway) and own it," O'Connor says. "Other countries have adopted that model, but we have not."

O'Connor suggests the government give corporations public policy incentives, which would insist that, as telephone companies enter into new areas of the communications business, they ensure schools and libraries have computer access.

If Congress listens to the president's NII Council, it would recommend that supportive mechanisms, such as incentives and subsidies, be evaluated and implemented if competition doesn't provide universal service.

Congress is currently wrestling with this issue. Universal access was provided in the Communications Act of 1934 when a national phone network was introduced. Now the act is again under debate in Congress. Two bills that rewrite the 1934 Act were pending as *PC Novice* went to press. One in the House of Representatives, introduced by Rep. Thomas J. Bliley Jr., R-Va., would open up network competition between local telephone companies within 18 months after the bill was enacted. Another in the Senate, introduced by Sen. Larry Pressler, R-S.D., includes similar legislation, but the deadline for open competition would be 160 days after the bill was enacted.

The acts include complex regulation and amendments. Proposed amendments to the Senate bill include: the Decency Act that would prohibit distribution of "obscene, lewd, lascivious, filthy, or indecent" material online; a rural access amendment that would assure access to Americans in less-populated areas; and an Interoperability Act that would require companies creating products and technologies to work together, making the technology available to the broadest number of people.

This technical issue has been fought in courts and regulatory bodies, where the public isn't fairly represented, O'Connor says. By the time citizens discover they're being left out, it may be too late. They'll have to wait another decade or so until the technology comes to them.

An Open Door

Who's going to end up paying for a Superhighway with video, sound, and data? In the long run, it's the consumer. The telecommunications companies will probably still recoup the costs of serving rural or inner-city areas by charging more in the profitable markets. Consider, however, that the consumer paid to make telephone service universal, whether it was utilized or not.

Is it fair? It all breaks down to if you believe that the market should determine who gets access and when. Views seem to change when you live farther from the lanes of the Superhighway.

Universal computer access is necessary if we want to create a National Information Infrastructure connecting everyone to all kinds of information. But it's no "great equalizer." It won't relieve those living in poverty or without education. Nevertheless, it leaves open the door to opportunity. ●

by Cindy Krushenisky

Find the Ninas

When Al Hirschfeld's daughter Nina was born, he celebrated by "hiding" her name in his drawings. In this classic caricature of Jack Nicholson, find the Ninas and circle them. Hint: Hirschfeld always gives a clue of how many Ninas are in the picture. Find the clue and it just may help you find the Ninas!

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To enter find the Ninas, circle them and mail this entire ad to Jasmine at the address below. No purchase necessary. All entries must be postmarked by December 31, 1995. No cash equivalent or substituted prizes are offered. Employees of PC Novice and Jasmine Multimedia, are not legible in enter the contest. Contest is subject to all local, state and federal regulations and is void in Georgia, Utah, Michigan, Rhode Island, Oklahoma, New Mexico, South Dakota, Virginia and where otherwise prohibited by law.

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To order HIRSCHFELD GREAT ENTERTAINERS, or for the name of a retailer in your area, call the number below.

6746 Valjean • Suite 100 • Van Nuys, CA 91406

Tel: (818) 780-3344

HIRSCHFELD 6

Getting The Word Out:

Dictionaries For Your Computer

Whether you're meeting with a client, applying for a job, or talking with a teacher about an assignment, how you look and what you say often make a big difference in the way you're perceived. If you use words incorrectly or have a limited vocabulary, people quickly lose interest. When it comes to written documents, communication also depend upon the words you choose. A computer can help you make a favorable impression by grooming your word selections.

Most popular word processors include a spell checker and a thesaurus. These writing aids improve word power, but they're not enough. To become an expert wordsmith, you need a good dictionary. This month, we examine six popular electronic dictionaries.

Complete With Photos

If you want a Windows-based multimedia dictionary with word pronunciations, video clips, and colorful animations, look elsewhere. *The American Heritage Illustrated Encyclopedic Dictionary* (MS-DOS) isn't for you. This "plain vanilla" CD-ROM dictionary hasn't been updated since December 1992.

If, however, you want an inexpensive electronic dictionary with more than 180,000 entries and nearly 4,000 full-color illustrations, let your buck stop here. Based on the Houghton Mifflin printed dictionary of the same title, this electronic reference is super fast (even if you run it entirely from the CD-ROM without installing any of its files to your hard disk). You don't need a high-end computer for it to operate smoothly, either.

American Heritage has a graphical look, and it supports a mouse. To launch it, log on to your CD-ROM drive, type **ahd** at the DOS prompt, then press ENTER. Unfortunately, there's no option to hotkey from an open application to the dictionary. Also, some features described in the dictionary's voiced introduction are actually unavailable. For example, TAB/SHIFT-TAB can no longer be used to move from one interface option to another, and the program only returns up to 1,000 matches (not 2,000) for a search.

You look up a word by typing it into a Find window. You also can enter a word's letters by selecting them with the mouse from an alphabetical list. If the dictionary doesn't have a definition for a word entered, a narrator makes an announcement letting you know. Some words aren't defined because the lexical database for this program dates back to 1987. You can look up a word without knowing its exact spelling. Simply enter its first few letters, then click on Search. A list of words beginning with those letters quickly appears on-screen. This look-up feature also proves handy if you want to find more than one word beginning with particular letters.

Several words in the dictionary have an associated picture or pictures, which are high-quality color photographs. American Heritage doesn't let you access its picture list directly. You only can view a word's associated image by selecting the Images button from the word's definition screen.

Practically every word in an American Heritage definition is "hot," letting you select it and look up its definition with a mouse click. It may contain hotlinks to related words. A Recent button at the bottom of the Entries Found screen lists up to 20 of your most recent inquiries. You can return to a definition for any word on this list, first by highlighting it with an arrow key, then clicking ENTER. The dictionary doesn't have a print option. In sum, American Heritage is a fast, standalone reference with high-quality photographs. However, it needs a lexicon update and hotkey access from an open DOS word processor.

American Heritage Illustrated Encyclopedic Dictionary
$29.95
Xiphias
(310) 841-2790

It Talks

What this dictionary lacks in pictures and video clips, it makes up for in word pronunciation. Based on the 1992 edition of Houghton Mifflin's American Heritage Dictionary of the English Language, Softkey's *American Heritage Talking Dictionary* (Macintosh/Windows CD-ROM) sports a lexical database more recent than the one reviewed above, with more than 200,000 words.

This dictionary presents alternate word spellings (if available) and offers direct access from the Tools menu of your favorite Windows word processor, such as *Microsoft Word*. Plus, it includes a copy of Roget's Thesaurus with 1.5 million synonyms. Special buttons just below the program's menu bar make it easy to switch back and forth between dictionary and thesaurus. If you select Split Screen from the Dictionary's Options menu, however, you can view both dictionary and thesaurus entries for a selected word simultaneously. Of course, if your word processor already has a thesaurus, you don't need to install a second one.

The Talking Dictionary has several other goodies. There's an optional Word of the Day, which automatically displays and pronounces a new word each time you open the application. This vocabulary builder presents words by difficulty level (intermediate, advanced, or expert) so you can gradually improve your word power. A Next Word option within the Word of the Day dialog box lets you see another word from the active level without having to exit and reopen the dictionary.

This dictionary features biographical entries for more than 8,000 people. A Word Hunter lets you search for words by their meanings. This feature is perfect for people who constantly have words on the tips of their tongues but can't remember them. You can narrow a definition search with help from words such as *and*, *or*, and *not*. Any definition can be copied to the Clipboard for pasting in another application.

Another significant feature includes the Anagrams option. Select this option to find words containing the same letters as a target word. For example, type **wears**, click the Anagrams button, and select Full Word. Press OK, and the dictionary searches its databases, displaying five anagrams (sawer, sware, swear, wares, and wears). You also can direct the program to search for anagrams containing just a minimum number of letters from the target word.

A wildcard function lets you search for words containing a question mark (which stands for a single character) and an asterisk (which stands for an indefinite number of characters). For example, type **w??r**, press ENTER, and the Dictionary presents the following list of words: W-hr, wear, weer, weir, wesr, whir. Type **w*r**, and the program finds 490 matches. Finally, the Talking Dictionary includes a Dictionary of Cultural Literacy with entries for religious concepts, historic events, and other categories of knowledge.

A full installation copies the entire contents of the CD-ROM to your hard disk. While this speeds up word searches and leaves your CD-ROM drive free, it consumes 18 megabytes (MB) of hard disk space. You could install fewer files on your hard disk to save space, but this slows the dictionary's performance.

The American Heritage Talking Dictionary
$59.95
Softkey International
(800) 323-8088
(617) 494-1200

Learn Sign Language

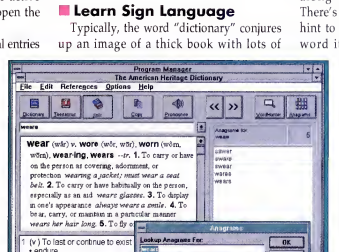
Typically, the word "dictionary" conjures up an image of a thick book with lots of definitions, but there's more than one type of dictionary. Consider *The American Sign Language Dictionary on CD-ROM* (Mac/Windows). Based on the popular American Sign Language Dictionary series by Martin Sternberg, it contains video clip demonstrations, illustrations, and text descriptions for 2,200 word signs. In addition, it features games and practice sessions to help users learn sign language, tips on sign language etiquette, and a brief history of American Sign Language (ASL). An optional sign-in lets the program know you want it to track your performance in regular work sessions, games, and tests. New users are advised to take the application's audio-visual Guided Tour.

Selecting the Dictionary icon in the program's main menu lets you browse the dictionary in several ways. You can look for a particular sign (select Find at the bottom of the screen) or look for a sign by category (choose Browse Category). The dictionary organizes signs into more than 20 categories, including animals, family life, expressions, people, and sports. Browse A-Z, the third search option, currently doesn't work. It's supposed to let you search an alphabetical list of all signs in the dictionary. Technical support at HarperCollins suggests the company is working on a fix, but they don't know when it'll be available.

Once the dictionary finds a requested sign, its definition screen appears. You see the target word at the top of the screen, along with its phonic pronunciation. There's also a text definition and a written hint to help you associate a sign with the word it represents. A Cross-References button shows a list of all other dictionary entries that use the same sign.

The best thing about the definition screen is the video clip presentation. You actually can watch someone demonstrate the sign. Video controls manage the size and speed of presentation. You decide if the clip displays continuously or just once (Choose Preferences from the ASL menu). A Review button brings up a list of signs viewed in current (or previous) sessions.

Other modules in the program include a Skills section, where you practice signs learned in the current session, signs from all sessions (cur-



***The American Heritage Talking Dictionary* will search its database for anagrams of an entered word.**

rent and previous), or signs from the full dictionary. You also can access the Skills section to test your knowledge of sign language. You decide how many multiple choice questions to answer. The program then presents a sign, shows you its video clip demonstration, and asks you to identify it (with or without a timer). An ASL Concentration game also helps you associate a sign with its visual representation.

Sign language novices will appreciate the Fingerspelling module. Here, you enter a word or a letter in the appropriate field on-screen, and the program displays its Fingerspelling sign(s). It won't take you long to learn how to sign your name. A Fingerspelling Concentration game makes all this spelling work seem more like play.

If you need to learn American Sign Language, this program's video clip demonstrations are an invaluable teaching aid. You'll also find the games quite entertaining. The software, however, operates a bit sluggishly in its transitions from one module to another.

The American Sign Language Dictionary on CD-ROM
$79.95 (CD-ROM and book)
$69.95 (CD-ROM only)
HarperCollins Interactive
(800) 424-6234
(212) 207-7000

For Kids Only

Top-notch educational software requires more than just cartoon-like animated graphics and terrific sound effects. Take *Me and My World: Multimedia Picture Dictionary*, (Mac/Windows CD-ROM) for example. This application goes beyond mere vocabulary enrichment. As kids explore the program, exciting activities build reading skills. Unfortunately, some of the application's pedagogical techniques "punish" kids for not knowing how to read.

Designed for children ages 5 to 8, Me and My World introduces the familiar vocabulary of middle-class American life as seen through the eyes of a young boy named Timmy. His Magic Picture Diary contains 18 colorful illustrations of places he visits with family and friends. These include pictures of a classroom, supermarket, restaurant, post office, dentist office, bank, and zoo. Kids investigate Timmy's world by examining the photos in his picture album. They can click on an icon of an ABC Book to see an alphabetical list of hundreds of words found in the Magic Picture Diary.

The program begins in Timmy's room, where children have the option of exploring Timmy's picture diary or the ABC Book. To begin a picture dictionary adventure, kids click on the diary icon. It opens onto a diary page containing several photos. While each photograph is labeled, the program doesn't read a label aloud until the child actually makes a selection. This means that kids can't really "preview" a photo before actually exploring it in detail.

Clicking on a picture transports the child to a full screen illustration of that scene, crammed full of interesting objects. When children select an object, its word form appears at the top of the screen. Timmy reads this word aloud, and the program displays a humorous animation involving that object. Kids can hear the word pronounced as many times as they want by clicking on it.

Every page in the album contains from 30 to 35 words, at least 20 of which have accompanying animation. Every page also has special icons. For example, if children select the page title at the bottom of the screen, they jump to the Small Glossary page for that screen. It contains an alphabetical listing of all scene words. Kids can select a word on the list to hear it pronounced. There are no definitions. Words that children have already "visited" are marked with a green check.

In *Me and My World: Multimedia Picture Dictionary*, kids can click on items in this page to hear the word pronounced and see an animation.

If youngsters select the ABC icon in the upper right corner of the screen, they jump to the Big Glossary where they can click on words to hear them pronounced. Again, there are no definitions. Kids also can click on a word's picture to jump to the scene in which that word is located. Unfortunately, several words in the glossary merely display a picture of Timmy with the number "2." This icon indicates that a scene for that word will appear in the soon-to-be-released Volume 2 of the dictionary. It's an unacceptable advertising technique.

Clicking on the slide show projector icon in the lower right corner of the screen jumps to the slide show game, where kids can practice words they've learned from a particular photo. This screen shows nine objects from the scene just visited, plus three words. After Timmy pronounces one of these words, kids must find it, then draw a line from the word to its picture. Unfortunately, the word doesn't highlight as it's being read aloud, and there's no way to hear the word pronounced again. Beginning readers will find this activity difficult.

Every correct answer reveals another part of the picture's puzzle. If children complete an activity, the uncovered puzzle animates. Regrettably, youngsters are given only two chances to make a correct match. If they answer incorrectly on the second try, they're punished for not knowing how to read by having to restart the game.

Me and My World is an entertaining multimedia vocabulary builder with top-notch, audio-visual special effects. Beginning readers, however, will find several features disappointing. To add insult to injury, the publishers promise that sending in the registration card entitles customers to a "free" copy of the Me & My World Illustrated Picture Dictionary. But to obtain your free copy, you must send in $4.95 for shipping and handling and pay the registration postage. That doesn't "read" free to us.

Me and My World: Multimedia Picture Dictionary
$4.95
Future Vision Multimedia Inc.
(800) 472-8777
(516) 482-0088

A Big Selection

The Windows version of the *Random House Unabridged Electronic Dictionary* (CD-ROM) includes more than 315,000 entries, 115,000 pronunciations, and 2,200 line-art drawings. Created by WordPerfect and the Random House Reference editorial staff, it has virtually the same easy-to-use interface as WordPerfect's *Random House Webster's Electronic Dictionary & Thesaurus* (reviewed below) and many of the same definitions. It doesn't have a thesaurus, however. A full installation requires nearly 20MB of hard disk space, but you can opt for a minimal install (consuming about 1.5MB) and run the dictionary from the CD-ROM. It operates slower this way, but the performance hit isn't that noticeable.

Random House doesn't let you install a dictionary command in the Tools menu of your favorite word processor (unless you're presently running *WordPerfect for Windows* 5.2 or newer). If Random House is up and running, you can obtain a dictionary definition for a word in your open word processing document highlighting a word and pressing CTRL-SHIFT-D.

It's easy to Replace a word in your word processing document with a word or phrase from the selected word's definition. Just highlight the word to be replaced in the text of your word processing document, hotkey to its definition, select a word or phrase from the definition, and click the Replace button. Support for Copy and Paste lets you copy text from the dictionary definition for pasting into an open word processing document.

To use Random House's interface, point the cursor at a button in the definition screen, and a description of that button's function appears in the status box at the top of the dictionary window. Click on a menu bar item, or open a menu option, and the same thing happens.

You can print a copy of a definition, search for a word by keywords in its definition (just click the DefSearch button and enter the necessary keywords), perform wildcard searches using a question mark to represent a single character and an asterisk to represent an indefinite number of characters, and perform an Anagram search. Clicking on any word that appears in the Anagram window after the dictionary performs a search brings up that word's definition. Unlike the Anagram function in Softkey's Talking Dictionary, however, you won't be able to specify a search for a minimum number of target word letters.

Random House has thousands of illustrations, although they're only line drawings, not high-quality color photographs. There's no command to take you directly to the dictionary's illustrations. When you do find a word with an associated line-art drawing, however, just click on the little camera icon in the definition window. After the picture appears, you'll be able to copy it to the Clipboard for use in another application.

Random House Unabridged Electronic Dictionary v1.7 for Windows
$79 (CD-ROM only)
$100 (book/CD-ROM package)
Random House Reference and Electronic Publishing
(800) 733-3000
(212) 751-2600

For Your Student

The first thing you notice about the Windows edition of WordPerfect's Random House Webster's Electronic Dictionary & Thesaurus, College Edition (DOS/Windows/Mac) is that it ships on seven high-density diskettes instead of CD-ROM. A full installation of this dictionary requires about 11MB of hard disk space, as the product contains a 180,000 word dictionary. You can save about 1.4MB of space by not installing the 275,000 synonym thesaurus, if your word processor already has one built-in.

This dictionary doesn't automatically install itself as a menu option in your favorite word processor. If you're running WordPerfect for Windows 5.2 or newer, however, there's a special installation option to place the Webster's dictionary command in WordPerfect's Tools menu.

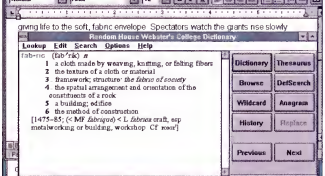
Like the Random House dictionary above, a hotkey option lets you look up a definition for a word in an open word processing document by highlighting that word and using a simple three-finger command (CTRL-SHIFT-D). However, Webster's must already be open underneath the word processing application for this to work. To replace a highlighted word in the word processing document with another word in its definition, highlight the replacement word in the Webster's dictionary definition window, then click the Replace button.

With Webster's, you can look up a word with wildcards (question mark for one character; asterisk for several characters), search for a term by words in its definition (click the DefSearch button), find a word's anagrams, or obtain synonyms by clicking on the Thesaurus button. You can't limit an Anagram search to a minimum number of letters, though, nor can you print a Webster's definition.

This dictionary doesn't talk, but if you rest the cursor on a button in its definition window, a description of that button's function appears in the status bar at the top of the dictionary window. Similarly, if you click on a menu bar option or open a menu command, a description of that function appears in the status bar as well.

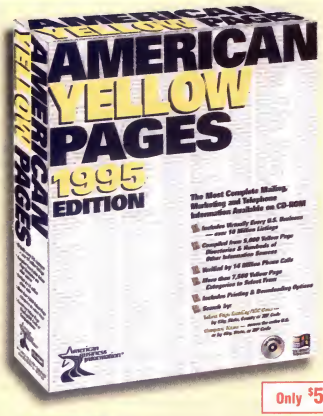
Random House Webster's Electronic Dictionary & Thesaurus, College Edition
$99
Novell
(800) 321-4566
(801) 225-5000

Each of these electronic dictionaries has its highlights. No matter which one you choose, your household shouldn't be without one. ●



Users can hotkey to a definition in the *Random House Webster's Electronic Dictionary & Thesaurus* while in a word processing application.

by Carol S. Holzberg, Ph.D.



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No-Hassle News?

Have you ever wished that you could convince your paper carrier to bring you the newspaper *without* the advertisements and fillers or that you could watch the news without commercials? Now, you *can* get your news without those annoying extras, without leaving your home or office. America Online, CompuServe, and Prodigy each have features that let you get current news on your computer.

America Online

America Online (AOL) has two news areas: Today's News and Newsstand. To enter either of them, click on the bar marked Go To Main Menu at the bottom of the AOL welcome screen and select the bar with the title of the area you want to enter. (Also on the welcome screen is an icon that gives you access to the "Top News Story." This takes you right to Today's News; the top story, which changes throughout the day, is highlighted.)

Today's News. This major news area has articles from around the world and includes photographs with many of the articles. Most of this window is occupied by a list of "headlines." To read one of the articles, double-click on its title. Along with the articles, there are folders for major news subjects, such as the Oklahoma bombing. If you double-click on the name of the folder, you'll get a list of stories on that topic. There are icons across the bottom of the Today's News window through which you can access news articles of specific types, such as U.S. and world events, business, entertainment, sports, and weather.

There is also an icon for the Search News function, which lets you search for a specific topic by entering one or more keywords. It will search all of the articles in Today's News and list those containing the keyword(s) you specified. (The Search News icon appears in all of the windows you can access through Today's News, with the exception of the Weather area.)

The U.S. & World section is divided into five categories: National, Washington, Health & Medicine, Crime and the Courts, and World. Once you've chosen one of these areas, you'll again be given a list of headlines from which to choose. Around the edge of this window are icons for "Capital Connection," *The New York Times*, "ABC News," *Time Magazine*, and Top Internet Sites. (The Top Internet Sites icon also appears in most of the Today's News windows.) These icons offer ways to access additional news from the U.S. and around the world.

The Business area has four categories: Top Business, Industry News, International Business, and Additional Resources. Once again, each of these will produce a list of related articles. There are also icons to access *Business Week*, *Investor's Business Daily*, Market News, and Quotes & Portfolios.

The Entertainment section offers nine major topics: People & Entertainment, Entertainment Industry, Art, Culture, Film, Theater, Music, Television, and Video. Several of these sections contain reviews of current releases.

The Sports section is broken into ten subtopics: Top Sports, Major League Baseball, NBA Basketball, NCAA Basketball, NCAA Football, NFL Football, NHL Hockey, Tennis, Golf, and More Sports. The More Sports heading leads to a list of "folders" with sports topics ranging from auto racing to luge and bobsled. You also can access Local Coverage and Scoreboard through icons in the Sports window.

The Weather window offers radar and satellite images, weather maps, and temperature listings. There are also icons to get the previous day's weather map, U.S. cities' forecasts, ski reports, and a chat room for weather talk with other AOL subscribers.

The Newsstand. The second news feature that AOL offers is called the Newsstand. It consists of online versions of about 75 newspapers and magazines, including the *Chicago Tribune*, *National Geographic Online*, and *Smithsonian Magazine*. Most of the publications available are the current month's issue (some even appear online before they hit newsstands) and have a wide selection of articles; a few of the magazines, however, only offer issues several months old, with limited article choices. Many of the publications also have chat rooms and/or message boards so you can discuss the articles with other readers or communicate with staff members.

America Online Inc.
(800) 827-6364
(703) 448-8700

CompuServe

To access most of the news services available through CompuServe, click on the News icon in the Services menu that appears after you've signed on. (To get to this menu, you'll

need to close the What's New window that will pop up on top of the Services menu.) This will open a window with a list of the Basic and Extended News Services.

Basic News Services. Among CompuServe's Basic News Services are nonsearchable databases that provide current and breaking news stories, including the Associated Press (AP) Online. In these databases, you choose your news from a menu list that appears when you select the news area you want to explore. You can't do a keyword search on CompuServe like you can on AOL. In that way, these databases are like the newspaper; you scan the headlines and read only articles that interest you.

The Associated Press is the wire service that journalists use to get nearly 300 stories a day as the stories are reported. The stories under the AP Online heading are updated hourly and stored for about 36 hours. AP Online's main menu offers 13 choices, including Latest News, Weather, National, World, and Business News.

The basic services also include a British wire service, PA News Online; the current edition of *U.S. News & World Report*; and Reuters/Variety Entertainment, which contains reviews and articles.

A Weather section lets subscribers see detailed local weather reports, including short-term forecasts, precipitation probability, and daily climatological data. Extended state forecasts, severe weather information, regional summaries, sports and recreation reports, and marine forecasts (where appropriate) also can be found. On top of all this, CompuServe offers detailed radar, temperature, and weather forecast maps, as well as aviation weather reports.

The last item under Basic News Services is Global and More Basic News. Under this area, users will find international wire services, congressional tracking, the daily edition of *Online Today*, syndicated columns, and the CompuServe News Forum.

Extended News Services. CompuServe also offers "extended" services, which involve charges above the monthly fee; the actual cost depends upon which pricing plan you choose and what services you use. By utilizing the extended services, users can gain access to such things as CNN Online, *U.S. News & World Report* Online (which includes back issues, a message board, and a library), the Weather Channel Forum, and *People* Online. Also included in this area are photos, entertainment, sports, and "crisis/hot news" items.

The Extended News Service is where users can find newspapers from around the world and a section called Newspaper Archives, which gives you access to more than 55 newspapers. The electronic versions of the newspapers found here include the full text of selected articles and don't contain the classified ads. In the Archives, you can search for words in the headlines or text of stories, but you only can search one newspaper at a time, and there is a surcharge of $1.50 for each full article you choose to view.

At the bottom of the list of services in the News window is an item called More Extended News Services. If you select this item, you'll be presented with a listing of other news services, most of which carry a connect time charge and/or a surcharge. Two of these services are NewsGrid and Business Wire.

NewsGrid. This is a searchable database, which means that you can perform keyword searches here. You can search all available articles by keyword or limit your search to one of these categories of articles: U.S./World Headline News, U.S. Business Headline News, World Business Headline News, and Market Update.

Business Wire. This area contains articles and press releases about the business world. Keep in mind that press releases contain only information that the company wants you to have, so they aren't necessarily objective. They can, however, be useful if your job requires you to keep up-to-date on the events in a given industry or within certain companies.

CompuServe's Extended News Services also includes a **clipping service** called Executive News Service, or ENS. (See the sidebar "Computerized Clippings.")

Finally, CompuServe has many magazines' online editions, which can be accessed through the Magazines icon in the Services menu. Again, the list is divided into basic and extended services, and this area works the same way the News area does. Many of the Extended Magazine Services listings carry a surcharge.

CompuServe
(800) 848-8990
(614) 529-1340

	America Online	CompuServe		Prodigy		
		Standard Plan	Alternative Plan	Basic Plan	Value Plan	30/30 Plan
Monthly fee	$9.95	$9.95	$2.50	$9.95	$14.95	$29.95
# of hours included in fee	5	Unlimited Basic Services	0	5	Unlimted Core Services + 5 hrs Plus Services	30
Cost/additional hour	$2.95	Extended Services = $4.80 Premium Services = $4 80 + surcharge of up to $15/ hr	Basic/Extended 300, 450 baud = $6 30 1200, 2400 baud = $12.80 9600, 14400 baud = 22 80 Premium = above charge & surcharge of up to $15/hr	$2.95	$2.95 for Plus Services	$2 95
News Services Requiring Extra Charges	None	Extended (+) $4.80/ hr Premium ($) $4 80/ hr + surcharge ENS, AP Sports Wire $15/hr Magazine Database Plus $1.50/article	UK Newspaper Library $1/Search if no titles found $5/Search of up to 5 titles $5/Addt'l 5 titles $7.50/full article	Access Atlanta, Newsday Direct, Tampa Bay Online, and Times Link $4 95/mo		

America Online's pricing system is straightforward; CompuServe and Prodigy offer different plans based upon how you intend to use the service.

Prodigy

You'll find Prodigy's news services under the News/Weather icon on the Highlights

screen, which you can choose to view after you sign on to the service. (Also on the Highlights screen you'll find a headline for one of the major news stories of the day. These headlines change throughout the day.) Once you open the News/Weather menu, the screen will contain several areas from which you can access news items. The largest part of the screen is occupied by five current headlines; you can view any of these stories by clicking on the button in front of the headline.

Prodigy also has an area called More of the Latest News, which offers three categories: U.S. News, International, and Politics. If you select one of these areas, you'll be presented with a short list of headlines about that subject. A third category on the News/Weather screen is Also in the News; this area contains some news articles and some Prodigy items, such as descriptions of the service. These headlines change fairly often. Along the right side of the News/Weather screen are bars representing 10 topic areas, which you select by clicking on the appropriate bar.

Quick News. This area contains one-paragraph news briefs on current topics. The headlines aren't listed; you simply page forward through the items. You also can go from Quick News to Quick Sports or Quick Business, which aren't accessible through the News/Weather screen.

Photos. Like CompuServe, Prodigy groups all of its photos together. When you select this option, you'll be given a list of current photos and the option to view an index of past news photos. (Through any of the online services, the clarity of photos will depend upon your monitor.)

Newsstand. Newsstand consists of 14 online publications, several of which require a subscription fee in addition to the monthly fee. Many of the publications found here are online "newspapers" for specific cities, such as Atlanta. One publication, *Newsday Direct*, which carries an enrollment fee but offers a free 30-day trial period, will tailor information for each user's location. There are also a few regular magazines' online editions.

News Perspective. This section has a variety of items: articles, political cartoons, polls, a news bulletin board, and a sports brief. Most of the information found here is background or special interest news.

AP Online. This is an area in which Prodigy shines. The coverage is thorough, and you can choose from specific categories (National, Washington, International, Business, Sports, Health/Science, and Entertainment) or opt to view All Stories, which gives you a listing of headlines of all stories from the AP wire service.

More News. This area consists of such features as 1994 Election Results, Lotteries, News Weekly Summary, People News (news from the entertainment world), and Political Profile, as well as a sports section.

NewsToons. NewsToons is made up of political cartoons. Topics range from the Simpson trial to baseball. A few cartoons' titles are listed on this screen, and an index of previous cartoons is available. The cartoons, like the photos, will vary in terms of clarity, depending upon your monitor.

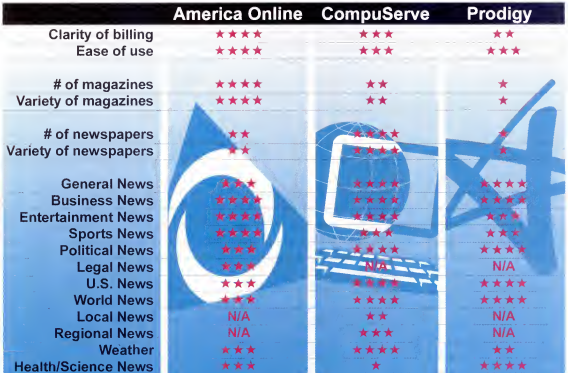
Polls. In this area, you can take a Prodigy poll and/or look at the results of both ongoing and completed polls. The polls cover such issues as movie preferences, political opinions, and sports picks. There are also weekly quizzes; the one available when *PC Novice* went to press was entitled "Test Your News IQ."

News BB. On this bulletin board, you can read notes posted by subscribers on a variety of topics. You also can reply to the notes, read other members' replies to the notes, and enter a chat room where you can have "conversations" with other members.

Weather. Prodigy's weather section has a U.S. weather map, regional maps and weather reports, city forecasts, and an international weather report. It also includes ski conditions, boating conditions, and fall foliage reports as appropriate.

If you're looking for a specific news topic on Prodigy, you can perform a keyword search. This option is available in the Search menu.

Prodigy Services Co.
(800) 776-3449
(914) 448-8000



Depending on your news needs, one of the services may stand out as the best choice for you.

How They Compare

Each of the services has a lot to offer in terms of news. Which service is best for you will depend

Computerized Clippings

If you like the idea of getting news online but don't want to spend time searching for interesting articles, you can make your computer do the work for you. Several companies now offer **clipping services**, which search the news for topics you've selected and collect articles for you.

CompuServe's clipping service, called Executive News Service (ENS), sets up electronic folders of articles on topics you've specified. You enter keyword(s), and ENS searches 20 wire services for the topics in which you're interested. The service costs $15/hour, in addition to your regular hourly charges. Fortunately, you only pay for the time you're logged on, not the time ENS spends collecting articles.

GEnie's QuikNews, for a monthly fee of $25, lets you search for up to 10 words or phrases. After that, each search costs $1. QuikNews gathers news from major online news resources, including Reuters News Service.

Dow Jones News/Retrieval (DJN/R), a third clipping service, is available directly or through gateways provided by GEnie and MCI Mail. DJN/R collects news from more than 1,200 sources. This service costs $15/month for each topic folder you establish, and $1.50 for every 1,000 characters of text collected. Dow Jones no longer charges for online time.

These services may cost more than collecting the news yourself through an online service, but they save you from sifting through articles that don't interest you, eliminating wasted online time. ●

For More Information:

Dow Jones News/Retrieval
(800) 522-3567
(609) 452-1511

GEnie
(800) 638-9636
(301) 251-6475

MCI Mail
(800) 444-6245
(202) 833-8484

upon what kind of news you're interested in, how much you're willing to spend, and what kind of interface you prefer. The differences are probably not significant enough that you'll want to change services if you already subscribe to one, but if you haven't decided which service to try, consider these factors:

Types of coverage. Do you just want to keep updated on current events? How important is sports or entertainment coverage? Sports coverage (particularly of sports other than football, basketball, baseball, hockey, and golf) and entertainment coverage are less thorough on CompuServe and Prodigy than on AOL. Both AOL and Prodigy contain an area with coverage of news on Crime and the Courts; CompuServe lacks this feature.

As far as general news, they all have relatively equal coverage; CompuServe and Prodigy draw most of their articles from the AP wire service while AOL's news comes primarily from Reuters. Only Prodigy's AP Online offers the option of viewing all of the stories from the wire service in reverse chronological order instead of having to choose a subject area. This may make it easier to find an article if you don't know which heading to look under or to scan the headlines for breaking news. Also, Prodigy's listing of AP stories includes the date and time that the story was reported along with the headline, so it's easier to see how recent a story is. On CompuServe, the date and time are only noted on the article itself, not the headline listing.

If your primary interest is in viewing magazines, AOL will be your best bet; it offers a wider range of titles and includes many of the most popular publications in the country.

Cost. If cost is your primary concern, you'll probably want to avoid using services with surcharges. With AOL, you don't have to worry about whether or not the area you're in is included in the basic rate; *all* of the services are included. With CompuServe and Prodigy, you do have to pay attention to where you're at and how much it'll cost you. Fortunately, both services include constant on-screen displays, letting you know which type of area you're in.

AOL offers one other money-saving feature; if you don't want to spend online time (and therefore money) reading articles, you can log them so that they can be accessed when you aren't online. Then, you only pay for the time it takes you to download the news, not your reading time.

To do this, choose Logging under the File menu. In the Logging window that appears, open a Session Log by clicking the Open button at the bottom of the window. You'll then see an Open dialog box, including a suggested file name and location. If you want to change any of this information, do so, then click Save. From this point on, all the text on-screen will be saved until you turn off the Logging feature. The other services don't offer this option, though CompuServe lets you save one item at a time with the Save As option in the File menu.

Interface style. Both AOL and CompuServe have interface styles much like the regular Windows interface; there are few differences, other than aesthetics. It did seem, however, to require a little more effort to get to the actual articles in CompuServe; you go through a few more steps, and often have to look in more than one place, because the news articles aren't presented in the easy-to-read list format used by AOL. With CompuServe, you need to have an idea of where the news you're interested in will be found, or you'll spend time searching for it—and when you're paying for that time, avoiding that step is more than a convenience.

Prodigy is easier to use than CompuServe, but not quite as straightforward as AOL. Prodigy's interface is not like Windows; you use "buttons" at the bottom of the screen to page forward or backward or go to a different area. There are also bars with area titles along the right side of the screen, giving you access to different areas of the service, depending upon where you already are.

One note: with Prodigy, you don't escape the commercial aspects of news as you do with the other services we've covered. Prodigy has a section at the bottom of the screen that has advertisements for various products, including cars, computer merchandise, and parts of the Prodigy service. This can become annoying if you're trying to get away from ads. These commercials, however, don't actually interrupt the news, or clutter your table with extra newspaper sections, the way television or newspaper ads do. ●

by Diana K. McLean

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Getting Started With WordPerfect For DOS 6.0, Part I

As you've probably heard from friends, by watching television, or by walking through a computer store, most people are convinced that graphical operating environments and systems like Microsoft Windows and OS/2 Warp are the future of computing. But not everyone has computers that allow the operation of these memory- and space-intensive operating interfaces and their respective applications. If you're in this category, or if you simply *prefer* the DOS operating system and its programs, never fear. Software manufacturers haven't forgotten DOS users.

Novell Inc., for example, takes pride in its DOS-based version of *WordPerfect* 6.0. This version of the most popular word processor available lets you perform tasks quicker and easier than previous versions with features like automatic faxing, label and envelope printing, and instructional Coaches to walk you through unfamiliar tasks. This article is the first in a three-part series that will begin to acquaint you with WordPerfect for DOS by walking through the program's basics. By reading this series, you will gain an overview knowledge of the program's most popular features.

NOTE: For the purposes of this article, we assume that you have installed WordPerfect for DOS on your computer. If you have not yet done so, please see page 3 of your "Getting Started" manual.

Starting WordPerfect

To begin using WordPerfect, you must tell the computer to load the program into its memory. First, change to the directory in which WordPerfect is stored. Unless you told the computer to save WordPerfect in a different directory during installation, the program is located in the WP60 directory. To change to this directory, type **cd\wp60** at the C> prompt and press ENTER. You may now load the program by typing **wp** and pressing the ENTER key.

The WordPerfect Display

WordPerfect has three display modes: **Text Mode**, **Graphics Mode**, and **Page Mode**. To change from one display mode to another, open the View menu by pressing ALT-V or by clicking the menu with your mouse pointer. Select Text Mode, Graphics Mode, or Page Mode by highlighting it with the arrow key and pressing ENTER or clicking it with your mouse. (The one you've selected will be marked with a check mark or an asterisk, depending which mode you're in.)

Text Mode. When WordPerfect is in Text Mode, you'll see the **menu bar** displayed across the top of the document. The menu bar has the following menus that you can select: File, Edit, View, Layout, Tools, Font, Graphics, Window, and Help.

Underneath the menu bar is the main portion of your document. A blinking cursor tells you where you can start entering text. Remember, however, that the characters are displayed in screen characters similar to those you see when typing commands at the DOS prompt—they don't look like the type of font or the font size you've selected to use. Attributes such as underline or italics won't appear as underline or italics but will be distinguishable from other text by color and/or shading. Everything *will* print correctly; you just can't see it on-screen as it will appear in print.

At the bottom-right of the screen, you'll see a **status line**, which tells you the document, page, line, and vertical and horizontal positions of the cursor. At the bottom-left, you'll see the document's name and **path** (the drive and directories in which it is found).

The View menu lets you select other items to display in the window. For example, you can choose to display a button bar, horizontal and vertical scroll bars, and a ribbon. Although these tools look different in the various display modes, they function the same. We'll explain them in more detail when we look at Graphics Mode.

As you select commands from the menus on WordPerfect's menu bar, you'll see that some perform an action immediately while others open **dialog boxes** or additional menus. A dialog box is a box that pops up on-screen to tell you something or ask you for more information. After reading the message in a dialog box and selecting command options, click the OK button with the mouse

or press ENTER to close the box and execute the command. If you want to exit the box without executing the command, you can click the Cancel button with the mouse or press the ESC key.

Text Mode isn't very fancy and doesn't require much memory. You'll want to use it if your computer has limited memory or if you don't have a graphics video card.

Graphics Mode. If you're familiar with Microsoft Windows or other **What You See Is What You Get** (WYSIWYG—pronounced "whiz-e-wig") environments, you'll like WordPerfect's Graphics Mode. In this mode, WordPerfect displays your document almost exactly as it will look when it prints. The font you select will be matched on-screen to your printer font and attributes like underline and italics will appear on-screen as underline or italics.

The window display also can look similar to a Windows application. The View menu lets you select graphical options like a button bar, horizontal and vertical scroll bars, ruler, and ribbon. (The items with a check mark to the left of them are selected and will appear in the document window.)

Just as it does in Text Mode, WordPerfect displays the menu bar across the top of the document window. The status line, document name, and path also are located at the bottom of the screen.

The ribbon, which is displayed directly beneath the menu bar, gives you fast access to options that affect the size and appearance of text in your document such as font, point size, text justification, and columns.

Underneath the ribbon is the button bar, which gives you quick access to frequently used commands. WordPerfect ships with 10 button bars. You can select seven predefined bars from the View menu or create your own. To carry out a command from a button bar, click the button for the command you want performed. For example, if you want to print your document, click the Print button on the button bar.

Along the right-hand side of the window is the vertical scroll bar and just underneath the document is the horizontal scroll bar. Scroll bars can be used to move quickly through a document. For example, if you're at the beginning of a document and you want to move to the middle of the document, click on the scroll box with the mouse and drag it to the middle of the bar. The on-screen view will change.

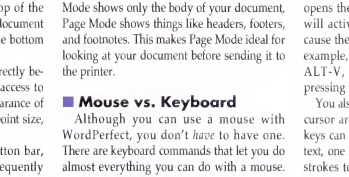
The ruler, which gives you a measurement for graphics or lines of text, is located below the button bar.

If your computer has enough memory, Graphics Mode is more pleasant to work in than Text Mode. You'll especially want to use Graphics Mode when you're working with graphics or equations.

Page Mode. WordPerfect's Page Mode is similar to Graphics Mode, but while Graphics Mode shows only the body of your document, Page Mode shows things like headers, footers, and footnotes. This makes Page Mode ideal for looking at your document before sending it to the printer.

Mouse vs. Keyboard

Although you can use a mouse with WordPerfect, you don't *have* to have one. There are keyboard commands that let you do almost everything you can do with a mouse.



When *WordPerfect* runs in Text Mode, it can make the ribbon, button bar, and the horizontal and vertical scroll bars available, looking different than in Graphics Mode.

Graphics Mode is more pleasant to work in than Text Mode.

These commands come in the form of **function keys** and **mnemonics**.

Function keys are the keys labeled F1 through F10 or F12 on your keyboard. By pressing a function key alone or in combination with the SHIFT, CTRL, or ALT keys, you can perform specific tasks. For instance, pressing F7 alone lets you exit WordPerfect; pressing SHIFT-F7 lets you print or fax your document.

Mnemonic letters let you activate menus and dialog boxes. By pressing a mnemonic letter and the ALT key at the same time, you can tell WordPerfect to display a menu. For example, pressing ALT-F opens the File menu. You can tell which key will activate which menu or command because the mnemonic letter is underlined. For example, after opening the View menu with ALT-V, you can select Text Mode by pressing the *T* key.

You also can use the keyboard to move your cursor around in your document. The arrow keys can be used to move the cursor through text, one line at a time. You also can use keystrokes to quickly move the cursor to either side of the screen or to the beginning or end of your document. For example, pressing the HOME key twice and then the Up Arrow moves the cursor to the beginning of the document. (For more cursor-moving keystrokes, see the table on page 55.)

Although you can use WordPerfect easily and quickly without a mouse, you'll want to use your mouse if you have one. The mouse lets you quickly block text, choose commands from menus and dialog boxes, or move the cursor around the screen. It also is needed if you want to use

WordPerfect's button bars, scroll bars, or ribbon.

When you move the mouse, a mouse **pointer** moves around the screen. In Text Mode, this pointer appears as a small, rectangular box. In Graphics Mode, it appears as an arrow. To move the cursor with the mouse, move the mouse pointer to the location where you want the cursor positioned and click the mouse button. The cursor will be repositioned.

Now that you know how display modes work and how to move around the screen, you can begin creating documents.

Creating & Opening Documents

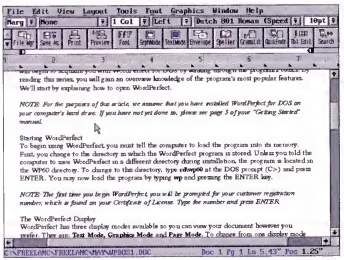
When you first open WordPerfect, you can automatically begin typing information because a new document is opened with the program. Depending on how much memory your computer has, you can have up to nine document windows open at once and switch back and forth between them.

To open a new document window, choose New from the File menu. Just as it does when you first open WordPerfect, a cursor appears in the upper-left corner of the window. You can begin typing, or you can open or retrieve another document into the window.

The Open command on the File menu lets you insert a document into a new document window. The Retrieve command on the File menu lets you insert a document into the document currently on-screen.

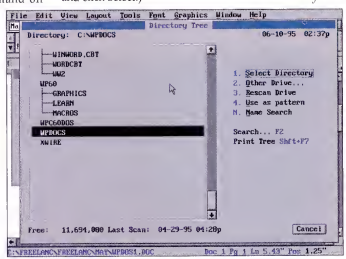
To open a document into a new document window, choose Open from the File menu. An Open Document dialog box appears. Type the name of the file you wish to open in the Filename box, noting that if the file is not in the current directory, you'll have to type the path. Once this is done, click the OK button, and the file will be opened.

If you're not sure of the path or the file name, you also can use the File Manager button to specify the document you want to open. When you click File Manager, you'll see a Specify File Manager List box. In this box, select the Directory Tree button. (You also can access File Manager from WordPerfect's button bar.)



When WordPerfect runs in Graphics Mode, the document window can look a lot like the windows found in the Windows operating environment.

The Directory Tree dialog box will pop on-screen. In this dialog box, the current directory is located in the upper-left corner. A list of subdirectories is found in the main box of the dialog box. A scroll bar to the right of this box lets you scroll to display additional subdirectories. Find the directory in which the file is located, highlight it with the mouse or arrow keys, and choose Use as Pattern. This inserts the path into the dialog box. (If you need to change to a different drive, select Other Drive, highlight the drive you want, and click Select.)



When retrieving and opening documents, you can use the Directory Tree to look at your directories and subdirectories to determine where a file is stored.

For example, assume you are using File Manager to open a document in a directory named MEMOS. Choose Directory Tree, highlight MEMOS in the dialog box that appears, and choose Use as Pattern. You will be returned to the Specify File Manager List dialog box, and C:\MEMOS will be specified in the entry field.

Now, choose OK. A File Manager dialog box will appear with a list of files in your chosen directory. Highlight the file you want to open, and select Open into New document on the right-hand side of the box or double-click the file with your mouse pointer. Either way, the file will be opened.

To retrieve a document into the current document, choose Retrieve from the File menu. The Retrieve Document dialog box, which looks just like the Open Document box, will appear. Type or select the name of the file you want retrieved and click OK.

NOTE: You can open or retrieve a document saved in a format other than WordPerfect 6.0, but WordPerfect must identify the format before converting it to WordPerfect 6.0 format. When a file is not in WordPerfect 6.0 format, a dialog box will let you confirm the document's format. If the correct format is highlighted in this box, choose Select to open or retrieve the file. If the correct format is not highlighted, select the correct format by clicking it with the mouse or using the arrow keys. Then click on Select.

Saving A Document

Once you type your document, you'll want to save it. There are two commands on the File menu that let you save your document: Save or Save As. The first time you save a document, Save lets you name the document (by displaying the Save Document dialog box). Then, whenever you want to save changes to that document, Save will automatically save the document without prompting you with a dialog box. If you want to save the changed file under a different name, choose Save As from the File menu or click the Save As button on the button bar. The Save

Document dialog box will appear, letting you save the file under a new name.

Inside the Save Document dialog box, type the file name in the Filename box. If you want the file stored somewhere other than the current directory listed in the dialog box, type the path along with the file name in the Filename box. If you want to share a file with a friend who doesn't have WordPerfect, you can save the document in a different format. Select a compatible format from the Format box.

You also can assign passwords to documents. Click the Password button in the Save Document dialog box, type in a password, and click OK. To make sure you typed the password correctly, WordPerfect will ask you to retype it. Write your password down somewhere—WordPerfect can't help you if you forget the password. If you want to remove a password, click the Remove button in the Password dialog box and follow the on-screen instructions.

Printing Your Document

There are two ways to print documents with WordPerfect. You can print a document that is currently open, or you can print a document without opening it.

To print a currently open document, choose Print/Fax from the File menu or click the Print button on the button bar. In the Print/Fax dialog box, you can select options like the number of pages you want to print and the quality of printout you want to receive. You also can preview the document before it prints with the Print Preview option. Once you've selected your options, choose Print.

To print a document from a hard disk, diskette, or network drive, choose Print/Fax from the File menu or click the Print button on the button bar. In the Print/Fax dialog box, choose Document on Disk. In the Document on Disk box, type the file name of the document you want to print in the Document Name box. Then click OK.

NOTE: To print a document in WordPerfect, you must have selected a printer and specified the printer port you're using. This was probably done when WordPerfect was installed. If not, see your manual for information about selecting a printer.

Exiting WordPerfect

When you're finished working in your WordPerfect document, you'll want to close it. Likewise, when you're through using the program, you'll want to exit it.

To close a document, choose Close or Exit from the File menu. If the document has not been saved since changes were made, you will be asked whether you want to save changes to the document. If you do, select Yes. If not, choose No. If you chose Exit and only had one file open, you will be asked whether you want to exit the program. If you do, select Yes. Otherwise, choose No.

To exit the program quickly if you have more than one document open, select Exit WP from the File menu. WordPerfect will display a list of all open documents. The Save checkbox can be selected for each document you have modified. Then choose Save and Exit to save the specified documents and exit WordPerfect.

Getting Help

You can get help for a feature you're using by pressing the Help function key (F1). If you press the key while in a document window, Help's Contents box appears, letting you search through Help to find the topic you want information about. If you press the Help key while in a dialog box or after selecting an option or menu item, help for that item is displayed.

To get basic information about word processing and WordPerfect, use the WordPerfect tutorial, which covers a variety of tasks. To use the tutorial, choose Tutorial from the Help menu and follow the on-screen directions.

WordPerfect also provides Coaches, which are interactive tutorials that help you complete tasks as you use them. To use a Coach, choose Coaches from the Help menu. Highlight the task you want to perform in the Coaches dialog box and choose Select. Then follow the on-screen prompts.

To exit Help, select Cancel, press Exit (F7), or the ESC key.

As you can see, you don't need to be nervous about using non-Windows word processors. Many of today's DOS-based applications use techniques and features formerly found only in Windows applications. As you experiment with WordPerfect for DOS 6.0, you'll discover that this program is as intuitive and easy to use as many Windows applications.

Practice the things we covered in this article. Selecting commands from the keyboard and with the mouse will soon become second-nature to you. And join us next month to learn how to edit and format your documents. See you then! ●

by Lori Beckmann Johnson

Following are some keyboard strokes that move the *WordPerfect* cursor.

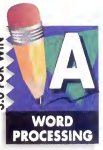
Key Stroke	Cursor Movement
CTRL, Left Arrow	Left one word
CTRL, Right Arrow	Right one word
HOME, Left Arrow	Left side of screen
HOME, Right Arrow	Right side of screen
CTRL, Up Arrow	Up one paragraph
CTRL, Down Arrow	Down one paragraph
PAGE UP	First line on previous page
PAGE DOWN	First line on next page
HOME, Up Arrow	Top of screen
HOME, Down Arrow	Bottom of screen
HOME, HOME, Up Arrow	Beginning of document
HOME, HOME, Down Arrow	End of document

For More Information:

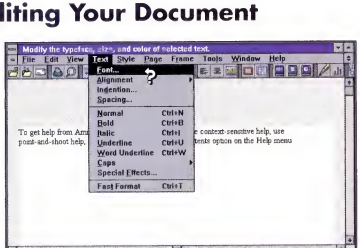
WordPerfect for DOS
(800) 321-4566
(801) 226-6800

Ami Pro 3.0

Editing Your Document



major reason word processors have pushed typewriters to the back corners of offices is the software's extensive options for editing text once it's entered. Let's explore some of these features in *Ami Pro* 3.0.



Once a passage is selected, a variety of formatting options are available in the Text menu.

When you're ready to edit an existing document, you'll first need to open it. To do this, choose the Open command from the File menu or click the SmartIcon on the far left—the one with an arrow pointing outside a file folder. An Open dialog box appears, and you can choose a file from the Drives, Directories, and Files boxes. If you're unsure whether the file you've selected is the one you want to open, click the Preview box so an *X* appears in it. (After clicking OK with the Preview box checked, the contents of the selected document will be displayed in a separate window.) Click OK to bring your document to the screen.

When editing, you can use the vertical and horizontal scroll arrows, bars, and boxes to move forward, backward, and side to side in a document. To move the insertion point to a new location, you need to click the mouse pointer in that location.

Let's look at the basics of editing a document's text.

Deleting text. You can delete text—individual characters or a block of highlighted text—with the DELETE or BACKSPACE keys. To delete individual characters to the left of the insertion point, press BACKSPACE. To delete characters to the right of the insertion point, press DELETE. When you want to delete a block of text, select the text and press BACKSPACE, DELETE, or begin typing new text. Note that pressing BACKSPACE deletes the selected text and one character to the left of the text. If you just begin typing new text, the new characters will replace the selected characters.

Moving text with the drag-and-drop method. To move text, highlight the words you wish to relocate. Click the insertion point anywhere in the selected text and drag the mouse (hold down the mouse button while you move it). The insertion point will change to an arrow with scissors by it. When the arrow points to the place you want to insert the text, let go of the mouse pointer, and the text will be inserted in its new location.

Copying text with the drag-and-drop method. To copy text, select the text you wish to copy. Hold the CTRL key while clicking the insertion point anywhere in the selected text. Drag the mouse until the insertion point is located where you want to copy the text. (This time the mouse pointer becomes an arrow with two little boxes attached to it.) When you release the mouse button, the text will be copied to the location you specified.

Moving and copying with Cut, Copy, and Paste. Another moving and copying method, which uses the Cut or Copy and Paste commands, works well for transferring text among documents but also can be used to move text within the same document. Select the text you want to move or copy. Then choose Cut from the Edit menu (or click the Cut SmartIcon, which depicts scissors) if you want to move the text and Copy from the Edit menu (or click the Copy SmartIcon, which shows two documents labeled with *A*s) if you want to copy it. Switch to the document in which you want the text to appear and position the insertion point where you'd like the text. Choose Paste from the Edit menu (or click the Paste SmartIcon, which shows a glue bottle). The text will appear in the new location.

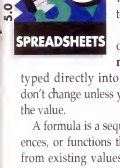
Inserting the date and time. Place the insertion point where you want a date or a time inserted. Choose Insert from the Edit menu. Another list will appear. Choose the Date/Time option from this list. An Insert Date/Time dialog box will appear. Here you can choose from several options. You can insert Today's date, System date, System time, Date of last revision, or Date created. You also can choose the format in which you want the information to appear.

Undo. To reverse actions with this command, the Undo Level in User Setup must be set to one or more levels. To check this, choose the User Setup command from the Tools menu. In the dialog box that appears, make sure the Undo level is set to 1 Level, 2 Levels, 3 Levels, or 4 Levels. Then click OK. Now, when you want to reverse an action, just choose the Undo command from the Edit menu and the action will be reversed. If your level setting is higher, you can undo actions that you did prior to your last action. ●

by Lori Beckmann Johnson

Excel 5.0

Entering Data



Once you learn to move through workbooks in *Microsoft Excel* 5.0, you'll want to add information to your spreadsheets.

You can enter two types of data: **constants** and **formulas**. A constant is data typed directly into a cell. Constant values don't change unless you select the cell and edit the value.

A formula is a sequence of values, cell references, or functions that produce a new value from existing values in your spreadsheet. A formula always begins with an equal sign (=). The values produced by formulas will change as other values in the worksheet change.

In this article, we'll discuss entering constant values only.

Entering Constants

To enter constant values into your spreadsheet, click the cursor (or the insertion point) in the cell you want to fill, type the information, and press ENTER. Your data's format depends partially on how it's identified to Excel.

To format a cell for a particular type of data, choose Cells from the Format menu. Click the Number tab. Under Category, select the data format you want. For example, you can choose Date to tell Excel the information consists of a date. Under Format Codes you can select a preset format (month/day/year, day-month-year, month-year) in which you want the data to appear.

Constants can be either text or numeric values, including dates, times, currencies, percentages, fractions, or scientific notations. We'll look at each type.

Numbers. Every cell of a new worksheet is formatted with the General number format. This format displays numbers as precisely as possible, aligning them to the right of the cell. For example, it allows for integer (123), decimal fraction (1.23), or scientific notation (1.23E+04) formats.

The numbers you enter should follow these guidelines:

- Numbers can include any numeric character (0 through 9) and the characters + - ( ) , / $ % . E, and e.
- Commas may be used.
- Periods are treated as decimal points.
- If you enter a plus (+) sign before a number, it will be ignored.
- Negative numbers should be preceded with a hyphen (-) or enclosed in parentheses.

You don't have to preset your cells. Much of Excel's entry formatting is automatic. For example, when you type a dollar sign, Excel changes the cell's format to currency. When you enter a percent sign, Excel changes the cell's format to a percentage. Formatting cells beforehand can make data entry quicker, however, because it eliminates the need to enter these symbols.

NOTE: You may encounter the symbol ####. Excel displays a series of number signs if a number is too long for the width of its cell.

Dates and times. Excel allows several standard formats for dates and times, formatting them to the right of a cell. Here are guidelines for entering dates and times:

- For dates, use a slash or hyphen. For example: 3/27/95, 27-Mar-95, 3/27, and Mar-27 are valid date entries.
- You can enter times by a 12-hour clock or 24-hour clock. To use the 12-hour clock, type **am**, **pm**, **a**, or **p** after your time entry. If you don't type one of these, Excel uses the 24-hour clock. You even can enter seconds in your times. The following are all valid time entries: 6:45 PM, 18:45, 6:45:33 PM, 18:45:33.
- To enter date and time in the same cell, separate the date and time by a space. For example: 3/27/95 18:45 is a valid date and time entry.

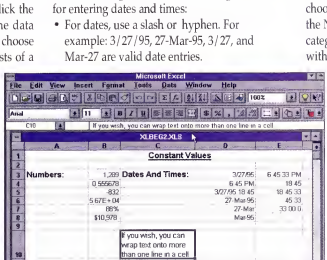
Text. Text can be numbers, characters, or a combination of numbers and characters. Anything entered into a cell that Excel doesn't interpret as a number, formula, date, time, **logical value** (a number created by a formula), or **error value** (a value, like #N/A or #VALUE!, that is displayed when a formula cannot be properly calculated for a cell) is interpreted as text. Text is aligned on the left side of a cell.

When entering text into cells, remember the following:

- Text can be up to 255 characters long.
- To enter a number as text, you can apply the Text format to the empty cell. To do this, choose Cells from the Format menu, select the Number tab, and select the Text category. Or, you can precede your entry with an apostrophe.
- If entries contain non-numerical characters, Excel automatically formats them as text.
- You can wrap text within a cell, letting Excel display it on several lines within a cell and preventing it from overflowing to adjacent cells. Choose Cells from the Format menu, select the Alignment tab, and check the Wrap Text box.

Entering data into your spreadsheet is easy. You just have to make sure you have it in the correct form. ●

by Lori Beckmann Johnson



Constant values in Microsoft Excel can be numbers, dates, times, or text.

Quattro Pro 3.0

Selecting Fonts

uattro Pro 3.0 for Windows offers much more than the ability to create essential spreadsheets. It also can make your text look like a graphic designer charged big bucks to do the work for you. Take a few minutes to learn how Quattro Pro can deliver stunning text that makes your spreadsheets more interesting.

Quattro Pro lets you present text in bold colors and any style of text, or **font**, available on your Windows computer. Fonts come in two basic categories: **serif** and **sans serif**. Windows installs a serif font called Times New Roman. It's a serif font because you see elaborate appendages, called serifs, on the edges of each letter. Sans serif fonts don't use fancy markings or elaborations. Arial is a good example of a sans serif font. Fonts used to make up menus and title bar text are members of the sans serif font family.

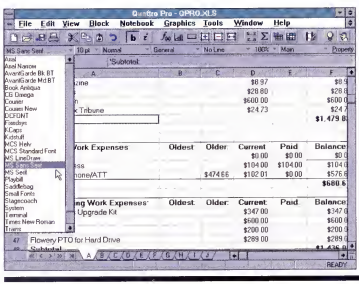
We've provided this font primer because it's important to know which font to use and when to use it. Beginners in the art of formatting text usually can be spotted because they overdo it. Text may be too bold, too large, or too colorful. It's a strong temptation, so remember that "less is more" in font selection.

Fonts For Single Cells

Choosing the right font is critical to making your spreadsheets easier to read, especially when there's a lot of data crammed onto a single page. A great feature of Windows is that it lets you select any font you wish and apply it to the text of a single cell or a group of cells. It all depends on how many cells you highlight when you apply that preferred font.

Let's choose a font for the text in your spreadsheet. We'll begin with the application of a standard Windows font and apply it to the text contained in one cell.

1. Open the spreadsheet you'd like to change.
2. Click on a single cell with text in it.



Users choose a font for selected text from this pull-down list.

3. Click on the Font button displayed to the left of the formatting toolbar to see a list of fonts available on your system.
4. Click on the font you'd like to apply to the selected cell.

Note that the Font menu closes as soon as you make your selection, and your choice is applied to your text immediately. You can apply any installed font to the text you select in this manner.

Fonts For Multiple Cells

Choosing and applying a font to the text in multiple cells is similar to the method used to work with a single cell. When working with multiple cells, you just have to highlight the cells you choose to edit. Remember that the first cell you select will not appear highlighted, though it is.

Use the following steps to apply a new font to multiple cells of text:

1. Open the spreadsheet you'd like to change.
2. Use the scroll bars to move through the spreadsheet until you see the cells you wish to edit.
3. Place the pointer on the top most cell to be edited, and drag the pointer until all of the cells containing text are highlighted.
4. Click on the Font button to see a list of fonts installed on your machine.
4. Click on the font you'd like to apply to the selected cells.

You can spend lots of time playing with fonts and applying them to various cells until your spreadsheet manipulation takes up an entire afternoon. Think about where the eye is led when it first views the printed spreadsheet. To test this, print your finished spreadsheet and, with a swift motion, bring the hard copy into your view as if you were seeing it for the first time. What you first notice is what everyone else will see, too, so think about where you want people's first impression to be formed. Remember the first time your buddies saw that bad haircut you had? First impressions mean a lot!

Next month, we'll cover Quattro Pro's custom formatting features that let you apply color, fonts, and shading to an entire spreadsheet with a single selection from a menu. ●

by Robert Mullen

Microsoft Word 6.0

Generating A Table Of Contents

6.0 FOR WIN

WORD PROCESSING

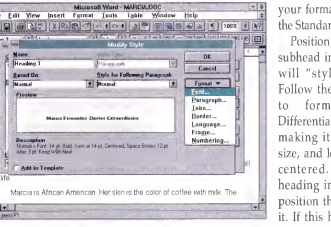
Multi-page projects such as reports and business plans benefit from a Table of Contents (TOC). Listing topic headings with page numbers underscores your message, enhances readability, and helps readers find information quickly. *Microsoft Word for Windows* 6.0 has powerful TOC capabilities.

■ Quick Summary

Word generates a TOC directly from heading styles you've applied to your document's title, headings, and subheads. You can use the program's nine built-in heading styles (selected from the Standard toolbar's Style drop-down list, which is located below the File menu) or create your own. Applying a heading style means formatting each heading with a particular font, font size, and font style. Using the same heading style for every heading guarantees identical formatting. Once every heading to be included in your TOC has been "styled," position the cursor where you want the TOC section to begin. Next, choose Index and Tables... from the Insert menu, then click on the Table of Contents tab in the Index and Tables dialog box that appears.

Word provides several TOC formats from which to choose. To preview formats before selecting one, highlight a TOC style in the Format window and check its appearance in the Preview window. Some TOC formats include tab leaders such as dots or dashes; others use lines to set off heading levels. Your TOC will have page numbers if you check the Show Page Numbers box. These numbers will appear at the right margin if you check the Right Align Page Numbers box. There's even a Custom Style option that lets you create a TOC based on styles used in the current document.

Click OK in the Tables and Index dialog box to generate a TOC, which appears in its own section at the flashing insertion point. Edit the TOC like any other text element. If you change document headings or modify the text that affects page breaks, update your TOC as well.



***Microsoft Word* makes it easy to create a heading style for a particular document heading level.**

Position the insertion point anywhere in the TOC to select it. When it turns gray, click the right mouse button. Choose Update Field from the resulting pop-up menu. Word asks whether to update the page numbers of the entire TOC.

■ Nitty Gritty

Before asking Word to compile a TOC, ensure that every TOC heading is formatted as a standard heading style. The Style list for a Word document comes with nine heading style options, with the first heading style (Heading 1) usually reserved for a document's main title. It typically is distinguished from other headings by its large type size. If you don't like Word's default heading styles for the current document, they're easy to change.

1. Highlight the main heading in document and select Style from the Format menu.
2. Choose Heading 1 from the Styles box, and click the Modify... button. When the Modify Style dialog box appears, click the Format button and select Font.
3. When the Font dialog box appears, choose font, font style, and type size for Heading 1. Click OK.
4. To center the main title, click the Format button again and choose Paragraph... . Then select Centered from the Alignment box.
5. Press ENTER twice to return to the Style dialog box, then select Apply. Now the main heading of your document appears with your formatting as Heading 1 on the Standard toolbar.

Position the cursor on the first subhead in your document. You will "style" it as Heading 2. Follow the steps outlined above to format this subhead. Differentiate it from Heading 1 by making it bold, a smaller type size, and left aligned rather than centered. Scroll to the next heading in your document, and position the cursor anywhere on it. If this heading is at the same level as Heading 2, click the Style button, then choose Heading 2 from the drop-down list. Text formatting, type size, and font choice apply automatically. When you reach a third-level heading (Heading 3), create and apply a different heading style to differentiate it from Headings 1 and 2.

After proofreading a document for heading styles, margins, headers, footers, and other elements that affect page layout and page breaks, you're ready to create a TOC. Choose Index and Tables... from the Insert menu to bring up the Index and Tables dialog box, and follow the steps outlined above.

If none of Word's ready-made TOC formats are based on styles used in your current document, Word lets you create a Custom Style TOC.

1. Open the Index and Tables dialog box.
2. Select Custom Style from the Formats box, then click the Modify button.
3. Style dialog box appears with a list of nine TOC Styles. Each should correspond to a different heading style in your document; modify them accordingly. For example, select TOC 1, click the Modify button, and in the Modify Style dialog box, tell Word how to format the font, spacing, and other settings. Do the same for each heading level in your document.
4. Click OK, and Word will compile a nice-looking Table of Contents.

by Carol S. Holzberg, Ph.D.

Lotus 1-2-3 4.0

Working With Graphs

s your spreadsheet information hard to grasp because of all those numbers? The *Lotus 1-2-3 for DOS* 4.0 Graph command translates your numeric data into a visual image, quickly and dramatically illustrating number relationships. Lotus 1-2-3 offers eight graph types, depending upon the data you are graphing. Area, bar, HLCO (High, Low, Close, Open), line, mixed (line and bar), pie, stacked bar, and XY graphs are all available.

Graphs are created from your worksheet data. Our illustration shows an original worksheet and a bar graph comparing 1994 and 1995 sales for four salespeople. Note how important it is to label the information in your graphs so it is readily understood.

To create a graph using the Graph command, open the worksheet you want to graph. Select Graph from the Lotus menu to display the Graph Settings dialog box. You can specify settings directly from the dialog box or from the Graph Menu above the box, which we will do in our example.

For our illustration, we selected Graph, Type, Bar. We then selected our data ranges so the computer knew what to graph. We selected X for the X-axis range and entered **a5..a8**, the cells containing the salespeople's names. We then selected *A* for the first data range to graph and entered **b5..b8**, our 1995 sales figures. We selected *B* for the second data range and entered **c5..c8**, our 1994 sales figures. Because our data was in consecutive columns and rows, we could have skipped these manual steps by simply moving our cursor to the graph range and pressing F10.

By pressing F10 or selecting Graph, View you can display the graph on the full screen; pressing any key returns you to the previous screen. If you need to change any of your ranges, re-select them and specify the correct data. You can clear all data ranges by selecting Graph, Reset, Ranges or clear individual ranges by selecting Graph, Reset and specifying which range you want to clear.

The graph still is in rough form at this point. For a graph to be understandable, it needs some descriptive data such as titles and legends. For our illustration, we selected Graph, Options, Titles, First and typed **Mojava U.S. Coffee Sales**. Then we re-selected Titles, chose X-axis, and typed **Salesperson**. We then re-selected Titles, chose Y-axis, and typed **Dollar Sales**.

Whenever you have more than one data range, legends are essential for defining your data. We selected Graph, Options, Legend, *A* and entered **1995** to identify the first data range. We re-selected Legend, chose *B*, and entered **1994** for the second data range. Rather than relying solely on the Y-axis figures, we entered data labels to display the specific sales figures. We selected Graph, Options, Data-Labels, *A*, specified a range of **b5..b8**, and chose Center to display the data above the bars in the graph. Then we re-selected Data-Labels, chose *B*, specified **c5..c8**, and chose Center.

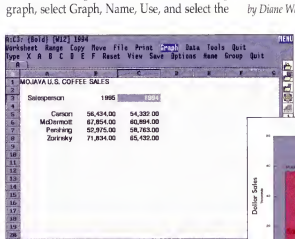
If you want to retrieve your graph settings later, you should name the graph and save your worksheet file. Use Graph, Name, Create, and type in a name for the graph. Once you name a file in this manner, you can view, delete, or change it. To retrieve an existing graph, select Graph, Name, Use, and select the named graph you want to view. Your named graphs are saved when you save your worksheet file, so be sure to save your file when you exit or you won't be able to retrieve any of your named graphs.

You also can save the graph currently in memory as a separate file by selecting Graph, Save, and typing in a name. It can be saved in either metafile format (.CGM) or picture file format (.PIC). Graphs saved in this manner can be imported into other applications, but remember that once graphs are saved using Graph, Save you no longer can make changes to them.

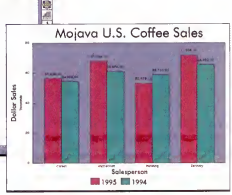
To print a named graph, select Print, Printer, Image Current (or Named-Graph). Graphs saved in .CGM or .PIC format can be imported into other applications for printing.

You also can change graph colors, text fonts and sizes, and add a three-dimensional effect to pie slices, lines, and bars. Graphs can be displayed horizontally instead of vertically, which puts the Y-axis on top rather than on the left and is most useful for bar graphs. Grid lines can be added to help show where data points fall on a graph. You also can use WYSIWYG (What You See Is What You Get) features to enhance graphs in a variety of ways. ●

by Diane Walkowiak



Figures often are more understandable when presented in a graph.



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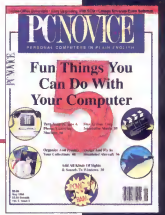

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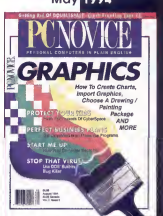

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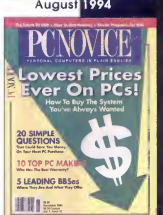

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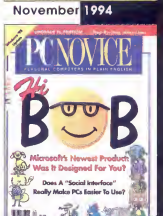

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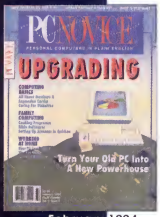

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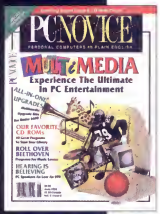

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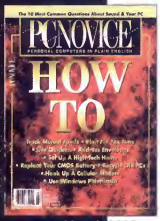

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Installing A PC Card Reader

Data storage options for your computer have evolved tremendously from the early days of computing. Your lone storage option with the first personal computers was a diskette, which made information mobile but lacked room for anything but the sparsest amount of data. Tiny hard drives eventually followed, providing space to store more data but sacrificing mobility.

Both means of data storage have improved over the years. Diskettes hold more data than ever, and today's hard drives are large enough to hold dozens of programs. The age-old problem still exists, though: Diskettes provide mobility but can't hold much data; hard disks hold plenty of data but can't move from computer to computer.

Leave it to the evolving world of portable computing to develop a solution—PC Card hard disks. They range in capacity from 40 megabytes (MB) to 200MB and beyond with disk compression. They're about the size of a credit card and can be moved easily from portable computer to portable computer. There's still one problem, though. While PC Card readers are found in about 90% of portable computers, according to industry estimates, they're rarely found on desktop computers.

Again, there's a solution. An internal PC Card reader, also known as a card drive, can give your desktop computer the ability to use PC Cards. A mobile hard drive isn't the only benefit of a PC Card reader, though. PC Cards can provide network connections, modem access, and additional RAM for your desktop PC, among other features. We'll provide step-by-step instructions for installing an internal PC Card reader on your desktop computer.

Finding A Bay

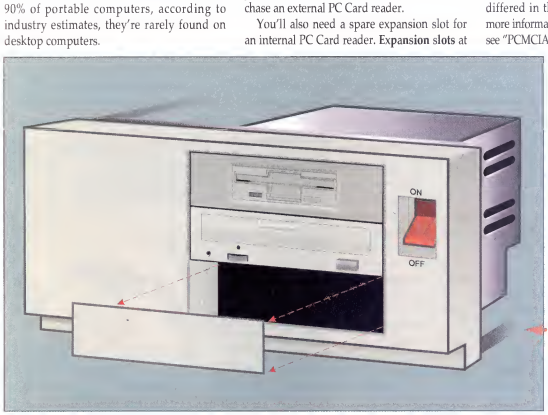
Most PCs have three drive bays containing a variety of components. You nearly always will find a 3-1/2-inch diskette drive in one bay. Some computers have a 5-1/4-inch diskette drive installed, and many have a CD-ROM drive connected through one of the bays. Others have a second 3-1/2-inch drive. Many other components, such as a backup tape drive, can be connected through a drive bay. Some newer PCs have a fourth bay containing a pre-installed CD-ROM drive. Regardless of the combination you have, you need an empty bay to install an internal PC Card reader. If you don't have a spare drive bay, you can purchase an external PC Card reader.

You'll also need a spare expansion slot for an internal PC Card reader. **Expansion slots** at the back of the computer serve as hosts to expansion cards. Each expansion slot corresponds to a hole in the computer case that gives you access to the expansion cards. An **expansion card** gives your computer additional capabilities; modems and sound boards are among the hardware contained on expansion cards.

PC Card Readers

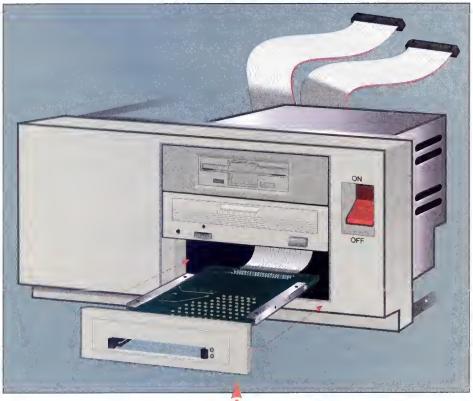
While the general steps for installing a PC Card reader are similar, each brand of hardware will have a unique quirk or two. Read your instruction book before beginning so you are familiar with the necessary steps, and keep the book nearby when performing an installation.

For this guide, we installed two brands of PC Card readers—a CardSharkII from Curtis Inc. of St. Paul, Minn., and a CardDock from Greystone Inc. of Los Gatos, Calif. Both readers contain slots for housing two Type I or Type II PC Cards, although some brands allow four cards at once. Installation of both drives was fairly easy, though neither brand included extensive installation instructions. During our step-by-step explanation, we'll note areas where the two brands differed in their installation procedures. For more information about PC Cards and PCMCIA, see "PCMCIA Unscrambled."



1. Unplug the computer and monitor from their power sources. Disconnect the monitor from the computer and move it out of the way. Remove the PC's cover. Most covers are held on by screws at the back; once you remove them, the cover should slide off either toward the back or the front. Some covers are held on by latches as well. Don't use a magnetized screwdriver; magnets can erase the data on your hard disk.

2. Remove the cover on your empty diskette drive bay. This can be a tricky step, especially if the bracket containing the diskette drives is awkward to circumnavigate. The drive



bay cover is a flexible piece of plastic similar to the computer casing. It usually is held in place by latches on either side.

On most computers, the plastic cover should pop out of the bay when you apply pressure from the back. If you can reach the cover with your fingers, apply pressure in the middle of the flexible plastic until it bends enough to pop out. If the bracket holding the diskette drive(s) prevents you from reaching the cover, use a screwdriver or a long, unsharpened pencil to apply the pressure. If you're forced to use a screwdriver to pop out the cover, be careful not to tear loose any wires attached to the diskette drives.

In extreme circumstances, you may need to move the bracket or diskette drive to gain access to the bay cover. This would be a rare occurrence, though, and a process you should avoid unless you've exhausted all other possibilities. Check your computer's user guide for advice on removing the drive bay cover.

3a. With some brands of PC Card readers, you'll need to connect the 40-pin cables to the reader unit. The Greystone reader required manual connection of the cables, while the cables on the Curtis brand were connected at the factory. Each cable is a different length and corresponds to a different receptor on the reader. Your instruction manual should have a guide for correctly connecting the cables, or the installation guides will be drawn on the cables themselves.

3b. The Greystone model has an additional cable for telephone communications that we had to connect at this time. The telephone communications cable connects later to the expansion card.

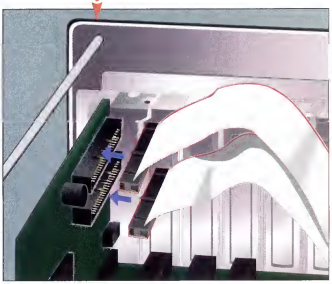
4. Now it's time to install the PC Card reader unit. Depending on your brand of PC Card reader, you may need to attach a piece of plastic mounting around the reader to make it rest properly in the bay. If the reader is far smaller than the bay opening, you'll need the plastic mounting to cover the hole around the reader and to support the reader. We needed the mounting with the Curtis reader but not the Greystone. Unfortunately, the mounting wasn't included with the Curtis model. Attach the mounting to the reader prior to installing it in the bay.

As you insert the reader into the drive bay, carefully pull the reader's cables through the back of the bay. Don't knock other components loose. Make sure you've pulled the cables tight through the bay, because you may need their entire length later to connect to the expansion card. The Curtis reader uses only two cables, while the Greystone has four.

5. After inserting the reader in the bay, secure it in place by attaching it to the interior bracket. Both readers have four mounting screws used to connect them to the bracket. Look at the diskette drives already installed to see how the reader should connect. You can skip this step for now if you'd rather make sure the reader is working properly before securing it to the bracket.

6. Select an empty expansion slot, and remove the metal expansion slot cover from the back of the computer case. It is connected by a screw on top of the cover. Remove the screw, and the cover should lift out from the top. Keep the screw; you'll need it to connect the plate on the expansion card to the computer case. When selecting a slot, try to choose one with an empty slot beside it to give you extra room for maneuvering the 40-pin cable connections.

7a. Connect the 40-pin cables to the expansion card. *(NOTE: To prevent static electricity buildup, keep the expansion card inside its packaging until you are ready to perform this step. Always handle it only by the edges.)* Once again, each cable has a specific receptor on the expansion card. Consult your installation



For details on how PC Cards, shown here, are classified, see "PCMCIA Unscrambled."

manual or the drawing on the cables to determine the proper connections. If your reader won't work properly following installation, double-check the cable connections; a cable connected to the wrong receptor could be causing your problem.

The 40-pin connectors on the cables should snap into the receptors without too much force from you. Make sure as you move the cables around you don't knock any other wires or cables loose inside your computer.

7b. With the Greystone reader, you'll need to connect the communications cable to the expansion card, too. The communications cable gives you a handy connection through the PC Card reader to a phone line, which is helpful if you're using a PC Card modem.

8. You now can install the expansion card. It will require a little more care than typical expansion cards because of the cables already attached to it.

The expansion card's connector slides into the expansion slot. The **connector**, which looks like an insertion tab along the bottom of the card, contains a series of gold pins that perform the data exchange between the expansion card and the computer. If the card is inserted properly, nearly the entire connector will fit into the slot; only the extreme top of the gold pins will be visible. Because the expansion card fits tightly into the slot, you may find it easier to roll the card into the slot by placing a corner in the slot first and then inserting the remainder of the connector. *While the card will require some force to insert properly into the slot, you shouldn't jam the card into the slot because you might damage its components.* Secure the expansion card to the computer with the screw you removed from the metal expansion slot cover.

9. At this point, you can replace the computer cover. *(NOTE: If you skipped it during Step 5, secure the PC Card reader to the bracket prior to replacing the cover.)* A few people would rather install the software and make sure the PC Card reader is operating properly before replacing the cover. Unless the cover on your computer is difficult to remove, though, we recommend you replace the cover before installing the software to prevent potential harm to the inside of your computer. It's a good idea to leave your computer cover off as little as possible.

10a. With both brands of PC Card reader, you must install the hardware prior to installing the software.

The *CardSoft* software included with the Curtis PC Card reader provided support for DOS and Microsoft Windows. Installation was menu driven and easy to follow. As with any software, though, it can be troublesome, depending on the configuration of your system. Curtis devotes eight pages of its installation guide to the software and just one page to the hardware.

During installation, CardSoft changes your system files, so you'll want to make backup copies of Config.sys, Autoexec.bat, and all .INI files. If you are running a memory management program, CardSoft's installation program will detect the program and require you to edit your Config.sys file to make certain its device drivers have the memory needed to operate. The installation program didn't make the changes for us; we had to edit the Config.sys file manually.

The PC Card reader requires the software to work properly. If you work in Windows, you can have CardSoft run as a minimized icon. It then will notify you what type of card you have in each slot. When you insert a card, CardSoft will beep to acknowledge recognition of the card.

10b. With the Greystone reader, *CardWare* software is used. CardWare can be installed from either DOS or Windows. The installation program automatically will update your Autoexec.bat and Config.sys files, or it will let you make the changes manually. You'll want to make backup copies of your system files.

Certain computer systems may experience conflicts, especially with network cards. The CardWare user guide explains how to correct such conflicts.

CardWare lets you track the types of cards installed in each slot when working in Windows. A series of beeps notifies you when a card is ready for use or when a card isn't properly recognized.

PCMCIA Unscrambled

PC Cards are more than a passing fancy for portable computer users; they've become a portable computing necessity. They're also becoming more prevalent in desktop computing. The industry's growth is hardly surprising, though, considering the cards' convenience and usability. Industry analysts expect the number of computers manufactured with PC Card readers to increase 1,000% from 1993 to 1997. More than 23 million computers—desktops and portables—should contain the readers by 1997.

What is this PC Card phenomenon, though? What do all of the abbreviations and acronyms mean? Let's delve into the world of PC Cards and PCMCIA.

Decoding PCMCIA

The Personal Computer Memory Card International Association (PCMCIA) is an organization based in Sunnyvale, Calif., consisting of various computer and peripheral manufacturers. The organization sets the standard for items that allow computer systems to be more interchangeable. The PCMCIA, which was formed in 1989, focuses its attention on PC Cards.

Many people refer to PC Cards as PCMCIA Cards, but the association prefers the name PC Cards. The standard governing PC Cards is called the PC Card Standard. The standard gives computer manufacturers a guideline to follow when creating PC Cards and is designed to ensure compatibility throughout the industry. When you purchase a PC Card, it should work with all PC Card readers that follow the standard, and the PC Card logo identifies products that meet the standard. With numerous new companies constantly joining the PC Card industry, you'll want to make sure any product you purchase meets the PC Card Standard.

Widespread implementation of the PC Card Standard has helped alleviate incompatibility problems that existed in the early days of the industry.

Size Standards

All PC Cards are about the size of a credit card and contain 68 pins that make up their connectors. They're exactly 54 x 85.6mm in size, or 2.126 x 3.37 inches. The cards vary in thickness to give them their various features. Each type of thickness is referred to as a different **type** of card. Three card types are in widespread use, and some people use a fourth type. We'll explain how each type differs.

Type I: The card is 3.3mm thick, making it the thinnest type of PC Card in use. While Type I cards aren't used much now, they still provide some important features. Type I cards generally provide additional RAM or memory improvements.

Type II: The card is 5mm thick and is the most popular type of PC Card. Type II cards generally are used for input/output features, such as modems and network connections. One of the newest features in PC Card modems is the retractable phone connection. On such cards, the connector that holds the clip for the phone line remains inside the boundary of the PC Card until you extend it. This prevents inadvertent damage to the connector.

Type III: The card is 10.5mm thick and is the thickest card in widespread use. Memory enhancements and input/output features are found in Type III cards. Wireless communication devices and hard disks are among the types of PC Cards used with Type III. With most PC Card readers, you can install two Type I or Type II cards in a slot or one Type III card.

Type IV: The card is 14.5mm thick. Toshiba builds cards and slots designed to use Type IV technology, but the PCMCIA has voted against accepting the Type IV format as part of the PC Card Standard.

PC Card Problems

With all of the benefits available, PC Card drawbacks are minor annoyances. Many of the drawbacks, such as incompatibility and large memory problems, have seen great improvements in recent years.

Some PC Cards will cause severe battery drain on your portable computer; you'll want to insert the cards only when you're ready to use them. You'll still find some memory problems, especially if you're using a memory management program, because PC Cards require a specific memory address. Windows 95 is expected to end such memory problems.

Current PC Card benefits still greatly outweigh the current problems. Adding key hardware components to your portable or desktop computer has never been easier. ●

Finding A Reader

PC Card readers for desktop computers are one of the hottest items for manufacturers; numerous companies have started making the drives recently. As when buying any hardware product, you'll want to remain with an established, reputable dealer. You'll find more desktop computers containing PC Card readers upon shipment as well. Hewlett-Packard was one of the first major computer manufacturers to include pre-installed PC Card readers.

While PC Card readers provide a great convenience for your desktop computer, there is one drawback. PC Cards can be fairly expensive, running $100 to $500 or higher, depending on the type of card. If you already have a portable computer, though, you probably already own a collection of PC Cards and are familiar with their benefits, so cost isn't a factor. With the addition of a PC Card reader to your desktop computer, you'll have a hard time finding a more convenient connection between your two computers than the PC Cards you're already using. ●

by Kyle Schurman

Harvesting PC Cache Crops

Americans have a passion for speed. That's why we love fast food, fast cars, and fast computers. Current, high-performance desktop systems fly through their paces with a 120 megahertz (MHz) Pentium microprocessor. In contrast, the 8088 microprocessor used in the first IBM PC in 1981 clocked at 4.77MHz and took about 12 cycles to execute a single instruction. A Pentium completes an average instruction in about one cycle.

Many factors affect system performance, so computer systems can't be compared solely in terms of MHz. All things being equal, however, a 100MHz Pentium roughly corresponds to a 1,000MHz 8088. Intel's P6 microprocessor, slated for introduction in the second half of 1995, will operate at 133MHz, about twice the speed of a 100MHz Pentium.

While central processing units (CPUs) have roughly doubled in performance about every two years, the speed of main computer memory (dynamic RAM or DRAM) has increased by merely 60%. That's because DRAM uses capacitors, which must be electrically recharged to keep DRAM memory "fresh." Each refresh cycle wastes system time. Computer manufacturers overlook DRAM's relatively poor performance, because the technology is inexpensive and "dense," meaning one chip can hold a lot of memory. To get around the speed differential between a fast CPU core and slower external memory, manufacturers place a cache, or small amount of very fast memory, close to the microprocessor. Special circuitry stores frequently used data and program instructions inside this small reserve of very fast memory in order to speed up information access and retrieval. It takes the CPU much less time to get information from cache than from main memory. It's a bit like the difference between waiting for a letter delivered by Pony Express and one sent by overnight mail.

The static RAM (SRAM) circuitry of cache memory operates quickly because it does not need to be periodically refreshed. In the best of worlds, users would fill up their computers with 16 megabytes (MB) of SRAM. That would be enough to meet the needs of increasingly powerful CPUs that process larger and larger sets of instructions and data.

But, says Dr. Ken Goodnow, an engineer with IBM's X86 Processor Group in Burlington, Vt., SRAM costs six to eight times per bit more than DRAM.

"Cache is a technological solution for a cost problem," Goodnow says.

Small amounts of SRAM are sufficient to improve performance, he says. SRAM cache tries to remember the instructions and data the processor asked for in the past, sometimes getting ahead of the processor. Because it takes the processor less time to access the cache than to access DRAM and because cache hit rates of more than 90% are possible with a cache structure, a little bit goes a long way. (A cache hit occurs when there is a request for information contained within a cache.)

Personal computers have two types of cache. Hardware-based caches require that special physical memory be added, and software-based caches rely on programs to reserve a portion of DRAM for cache purposes.

Level 1 (L1) Cache

In the evolution of Intel's 80x86 CPU architecture, the 486 (introduced in 1989) was the first CPU to have a small memory cache built directly into the microprocessor circuitry. Early 486 CPUs (such as the 486SX and 486DX) featured an 8 kilobyte (KB) internal cache, which became known as Primary or Level 1 (L1) cache. With the introduction of the 486DX4, Intel increased the chip's internal cache to 16KB.

All 486 CPUs had a unified cache, combining instruction and data. Good- now explains: "The microprocessor really deals with two kinds of information: program code [instructions] and results [data] obtained from these instructions. In a unified cache you store both together. The disadvantage is that if you happen to write the data over the instruction stream stored inside the cache, the processor must stop and go out to external [slow] memory."

When Intel designed the Pentium CPU, it divided the internal cache into two 8KB caches (one for instructions, the other for data). This allowed different parts of the CPU to access the cache at the same time. John Hyde, Intel's P6 technical marketing manager explains that CPUs with two smaller caches can overlap read of both, whereas CPUs with a single, unified cache can do only one read. This makes a faster system because the contents of two small caches can be read faster than those of a single, larger cache.

The key issue with L1 cache on a 486 microprocessor, Goodnow says, is not whether it's unified or separated into two cache reserves, but rather how large it is.

"We have run benchmarks here [at IBM]," he says, "and there's a big difference between an 8KB and 16KB cache. The more information you have close to the core, the faster your program is going to run. With a 16KB cache you can store more information closer to the core."

Other chip manufacturers build 486-compatible microprocessors that may implement different caching strategies.

Level 2 (L2) Cache

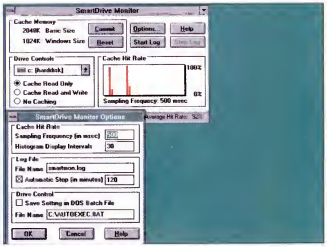
While early 486 systems had only an 8KB internal cache, Intel implemented a Secondary or Level 2 (L2) cache outside the CPU in higher-end 486 and Pentium systems to act as a second line of defense against information access from slow DRAM memory. Hyde says original equipment manufacturers (OEMs) can add an external L2 cache at any time because it's independent of the CPU. The first L2 caches appeared on systems with 100MHz 486DX4 chips and 60MHz Pentiums, he says.

L1 cache runs at the same speed as the core of the microprocessor. L2 cache, which resides outside the CPU, may not. For example, in bus-divided systems like the DX2, where the CPU runs at 50MHz or 66MHz, the L2 cache plods along at the speed of the external bus at 25MHz or 33MHz. Similarly, in clock-tripled systems such as the 100 MHz 486DX4, the CPU runs at 100MHz, but the bus runs at 33MHz. Here, L2 cache performance matches the speed of the external bus, not the CPU core. This means faster CPUs won't be held back by the slower L2 cache. Clock-doubling and -tripling techniques maximize PC power and performance without requiring computer manufacturers to design new systems or peripheral components.

The cache architecture of the new 133MHz P6 represents an improvement over the technology employed in previous microprocessors. It's the first high-volume CPU with two **die**, or components, in the same CPU unit. The P6 die incorporates an on-board, 16KB L1 cache consisting of an 8KB instruction cache and an 8KB data cache. The companion die is a dedicated 256KB L2 cache operating at the full 133MHz clock of the CPU clock, transferring 64 bits each clock cycle. The P6 external bus runs at one-half, one-third, or one-fourth of the CPU speed.

"In most Pentium systems, you find an L2 cache. In a P6 system, you *need* an L2 cache," Hyde says. "By putting the L2 cache inside the same package as the P6, we can run it at the same speed as the CPU." If the L2 were outside the package, he says, it would run at 66MHz—the speed of the P6 external bus. The microarchitecture of the P6, coupled with the proximity of the 256KB L2 cache, lets the P6 perform at about twice the speed of a 100MHz Pentium.

The SmartDrive Monitor utility provides a graphical view of SmartDrive's average hit rate (cache hits and misses). It also provides controls to set the caching mode of each cacheable drive on a system.



Write Operations

Cache content must be tied to the content of main memory for it to be current. In all 486 processors (except the 100MHz DX4) the CPU updates the content of main memory whenever it writes information to the internal cache. This is called a **write-through cache**. Because main memory is slow and because the CPU must wait for the update process to be completed, system performance suffers.

A **write-back cache** is one way around this bottleneck. This was used with the 100MHz 486DX4 and the Pentium. With write-back caching, the CPU updates the L1 cache without simultaneously updating the contents of main memory. Instead of doing individual writes out to main memory, the cache controller stores these writes and sends them to memory at some later stage. By caching writes and reads, system performance improves significantly.

Hyde says there are some situations where users may not want to implement write-back caching. If users working with animation used write-back caching, he says, all data writes would remain in the cache, and no animation would appear on-screen. Because write-through caching is sometimes needed, some vendors provide a choice of cache type at system startup, Hyde says.

The performance increase achieved through caching depends partly upon the application you are running. While benchmark tests indicate that systems with cache perform better than systems without cache, users may not notice a difference if they spend most of their computer time with software that doesn't depend on data retrieval.

Mark Vena, Presario product line manager at Compaq, says cache comes in handy with data intensive applications such as a database program used to manage 50,000 records. The cache will ease the CPU's load by storing repeated instructions. But DOS-based games and word processing applications, for example, aren't so data intensive and don't have the constant interaction between CPU and hard drive. Thus, Vena says, users of these applications typically don't see a big benefit with cache. Applications like CAD (computer-aided design) and sophisticated accounting packages that link six or seven complex spreadsheets would benefit from a cache, he says.

Disk Caching

Disk-caching applications, such as SmartDrive bundled with both MS-DOS 5.0 and newer and Windows, use software rather than hardware to implement a caching strategy. These applications are designed to read more disk data than the program calls for, then store this extra information in a portion of extended memory (RAM) set aside for cache. (Extended memory is that above 1MB.) While reading data from either the L1 or L2 cache is faster than reading data from main memory, accessing data from RAM is still much faster than retrieving it from a hard disk. RAM access is measured in nanoseconds (billionths of a second), while disk access is measured in milliseconds (thousandths of a second).

The version of SmartDrive supplied with DOS 6.22 is more recent and powerful than SmartDrive bundled with Windows 3.1. The newer release is able to cache read requests from CD-ROM drives, in addition to caching read requests from diskette drives and read and write requests for hard drives. To use the latest release, make sure the SmartDrive line listing in your Autoexec.bat file reads:

C:\DOS\Smartdrv.exe [options]

and not

C:\WINDOWS\Smartdrv.exe [options].

If the SmartDrive listing is not in your Autoexec.bat file, use the MS-DOS Editor or Windows Notepad to add the Smartdrv.exe command.

To cache reads from your CD-ROM drive, place the MSCDEX command before the SmartDrive listing. To see whether SmartDrive is loaded and how it is configured, type:

```
smartdrv /s
```

at the DOS prompt. For more information about SmartDrive, type:

```
smartdrv /?
```

at the DOS prompt.

If you don't specify a size option in the SmartDrive line, SmartDrive configures a cache size based on the amount of available extended memory in your system. In systems with 1MB to 2MB of extended memory, it reserves 1MB as the initial cache size and 256KB for Windows. In systems with 6MB or more extended memory, SmartDrive sets up 2MB for the initial cache size and 2MB for the Windows cache. To create a disk cache of 2,048KB and ensure that Windows will not reduce the size of the cache to less than 1,024KB, enter the SmartDrive line statement as follows:

```
c:\dos\smartdrv.exe 2048 1024
```

To trim SmartDrive so that it does not use much extended memory, enter the listing as:

```
c:\dos\smartdrv.exe 512 256
```

This reserves 512KB of extended memory for DOS applications but only 256KB for Windows. Luckily, Windows and SmartDrive work dynamically together. As Windows needs more RAM to operate, the amount of RAM reserved for SmartDrive decreases automatically.

If you don't specify drive options in SmartDrive's Autoexec.bat listing, the disk-caching utility caches hard disk reads and writes. This often dramatically improves system performance. However, disk write-caching (postponing cache write requests for a fixed time, until the CPU is idle, or until a certain amount of data has accumulated) could compromise a file's integrity if there is a **brownout** or power loss before the disk cache controller writes cache contents to disk. (A brownout occurs when the electricity level is reduced, but not cut off, for a period of time.) If power cuts out before data is written to disk, the disk file won't contain all changes made before the power loss. To disable write caching for all drives, add the /X parameter to the SmartDrive line listing in your Autoexec.bat as follows:

If applications still perform sluggishly with a disk-caching utility, consider installing more RAM.

```
c:\dos\smartdrv.exe /x
```

If you prefer not to disable write caching, be sure to type:

```
smartdrv /c
```

at the DOS prompt, before shutting down your computer. The /C parameter tells SmartDrive to clear all delayed-write data from the cache and commit it to disk. Placing the /C parameter in the SmartDrive line listing in Autoexec.bat as follows:

```
c:\dos\smartdrv.exe /c
```

tells SmartDrive to enable read caching and disable write caching. While this approach is the safest, disabling write caching slows overall performance.

DOS 6.x comes with a Windows utility called SmartDrive Monitor. This application provides a graphical view of SmartDrive's cache hits and misses, as well as controls that set the caching mode of each cacheable drive on your system. You can launch Smartmon.exe from the Program Manager by selecting Run from the File menu and typing:

```
c:\dos\smartmon.exe
```

Generally, the larger the cache, the less often SmartDrive needs to read data from disk. Experiment with SmartDrive settings to see which ones provide the best cache hit rates. Try to achieve a hit rate of at least 90%.

SmartDrive is a real-mode disk cache that loads into upper memory (the area between 640KB and 1024KB). It runs as a DOS program but also caches programs under Windows. Other disk caching utilities are available. Some, like Cacheclk.exe, a utility bundled with *Multimedia Cloaking* (Helix Software, 800/451-0551 or 718/392-3100, $39.95), work more quickly and efficiently than SmartDrive. Cacheclk.exe replaces Smartdrv.exe with a "cloaked" disk cache that runs in 32-bit protected mode under DOS and Windows. Helix claims Cacheclk.exe is up to 50% faster than SmartDrive. Cacheclk.exe supports disk caches as large as 256MB, as well as the caching of hard disks, diskette drives, and CD-ROM drives. The utility occupies as little as 3KB of conventional memory, and lets users dynamically adjust cache size from the DOS prompt. Another popular disk caching program is Symantec/ Norton's *Speedrive*.

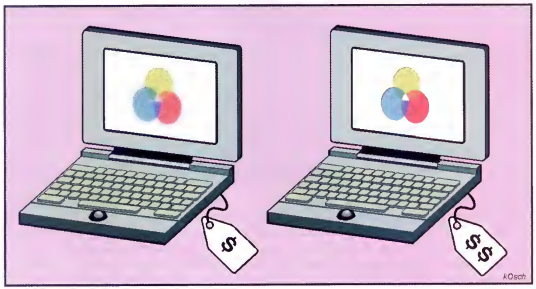
If you play a lot of CD-ROM games or run CD-ROM-based multimedia applications and the applications still perform sluggishly with L1, L2, and a disk-caching utility, consider installing more RAM.

"A system with only 4MB of RAM must go back and forth continually between CD-ROM and memory to access the application," Vena says. "As a result, animation and video playback display with jerky motion. Installing enough RAM for the application to load entirely into memory is one of the best things you can do to increase performance." ●

by Carol S. Holzberg, Ph.D.

Picking A Portable Picture

A Buyer's Guide To Displays



When travelers carry everyday equipment, small problems can loom large. The strap on a shoulder bag may be fine from car to office but can mercilessly cut into your shoulder during airport strolls. A multitool pocketknife may be handy when kept in the car's glovebox but unwieldy when carried in your pocket. Vagabond computer users face similar struggles. Many ignore a desktop PC's keyboard, for example, but discover that the smaller keyboard on a portable PC is nearly useless.

A portable PC's display plays a key role in whether you can live with the computer. Before buying, you should decide what display configuration provides the color, graphics, and visibility you need to work contentedly away from the cozy confines of your desk. Read on to learn about the choices you'll face in picking a display.

The type of consumer who wouldn't buy a hoagie without doing extensive market research may come across several portable display technologies as they study books and articles. These buyers turned bookworms probably will turn up information on terms such as gas-plasma and electroluminescent displays.

For the mainstream portable computer buyer, any information gathered on these technologies is strictly academic. Only one flat-panel display (FPD) technology, liquid-crystal display (LCD) in its various incarnations, is available on the portables most of us will ever see in stores and ads. LCDs accounted for 55.5% of all FPDs shipped in 1993, the most recent year for which statistics are available, according to "The Worldwide Flat Panel Display Market" report from Electronic Trends Publications. The report predicted that LCD unit volume would increase 11.3% between 1993 and 1998, from 400 million units to 680 million units.

LCDs are based on a sandwich of polarizing filters, the liquid crystals themselves, and a thin grid of electrodes placed between the crystals and filters on each side. Normally, the crystals let light pass through the filters. When the grid applies a charge to particular pixels, however, the crystals twist, blocking the light and producing a black dot on the screen. The process often is compared to opening and closing Venetian blinds. It's easy to visualize the LCD concept for monochrome (single color) displays since such screens essentially have the option of light or dark pixels. Color displays use color filters and subpixels that allow only red, blue, or green light through to produce color images.

LCDs are commonly found in copiers, calculators, and answering machines. In the past, LCDs in many PCs used ambient light to make the on-screen image visible. Today, however, all portable computers feature backlit displays for easier viewing in all situations.

LCDs themselves are divided into two categories: passive- and active-matrix. Passive-matrix, also called super-twist nematic (STN), displays use a grid of transistors placed along the side of the display. The transistors turn a row and column of pixels on and off. Active-matrix, or thin-film transistor (TFT), displays provide a transistor for each pixel so that each can be turned on or off individually.

Dual-scan technology, which is found in most passive-matrix displays, lets light pass through the pixels at twice the speed, providing a quicker **refresh rate** and a better picture. (The refresh rate is how fast the computer renews the screen, which is about 50 to 75 times a second.)

Chris Cooley, product manager for consumer portable products at Compaq, says the most common portable display measures 9.5 inches diagonally. Another popular configuration, according to Mike Wagner, director of customer marketing at Toshiba, is a 10.4-inch, dual-scan passive-matrix display. Some manufacturers offer screens as large as 11.3 inches in passive-matrix and 10.4 inches in active-matrix, according to Bruce Stephen, vice president of worldwide research at the research firm of International Data Corporation (IDC).

The Trade-Offs

The primary differences between active- and passive-matrix displays are in image quality,

width of viewing angle, and cost. (As technology improves, the gap between the technologies in the areas of quality and cost is constantly shrinking.)

Until about a year ago, difference in battery usage played a significant part in the buying decision between active- and passive-matrix. Toshiba's Wagner, however, says the latest active-matrix displays minimize this difference. Users of the two technologies now experience only a few minutes difference in battery life, he says.

Active-matrix displays, because of the greater pixel control provided by the individual transistors, yield a brighter, crisper image and faster response time. Active-matrix also provides richer colors. But IDC's Stephen says dual-scan, passive-matrix displays have nearly caught up to the quality of active-matrix. Active-matrix is still the superior technology, Stephen says, and will be included in an increasing number of portable PCs, but passive-matrix has improved enough that it suits the needs of many users.

Both display technologies, Stephen says, are comparable in quality to that of desktop monitors. Images tend to be compressed on laptop displays, making a spreadsheet, for example, look smaller. Wagner says the "vast majority" of portable displays offer 640 x 480 **resolution**. (Resolution is the sharpness of the on-screen image.)

As the difference in image becomes less distinguishable between active- and passive-matrix displays, other characteristics move to the forefront.

Compaq's Cooley says the technologies are tough to tell apart when viewed from in front of the PC. But from the side, an active-matrix display is easy to spot. Cooley says active-matrix screens are much easier to see from various angles than passive-matrix. To many users, this may be an inconsequential fact. To salespeople and the security-conscious, however, the difference can be crucial. Cooley says salespeople conducting on-screen demonstrations value active-matrix because it lets more clients view the sales pitch simultaneously and lets the presenter move about while keeping the image visible.

"Taken from my personal experience, being able to walk around a bit and see clearly is a big benefit," Cooley says.

Wagner says active-matrix is the display of choice for users who don't want anyone perusing on-screen data over, or from beside, their shoulder. Wagner says using the narrow viewing angle of a passive-matrix display in tight situations, such as on an airplane, can ensure information is for your eyes only.

If, then, you have no real need for wide-angle viewing and the two display technologies are so similar in image quality, how do you decide whether to pick active- or passive-matrix? Your budget may make the decision for you. In PCs with 9.5-inch displays, Cooley says, active-matrix technology could add about $600 to the price. For 10.4-inch displays, the difference may be as much as $1,000. As illustrated here, consumers can expect the price gap to widen with increasing screen sizes. Wagner says monochrome displays, available on low-end products, are $300 to $400 cheaper than dual-scan color displays. Any wallet-conscious, portable-buying decision will focus heavily on the display.

"The most expensive piece of a portable product is the display," Cooley says. "As displays get bigger, more engineering has to go into it to ensure that graphics and text are clear."

Active-matrix displays in particular have been more costly historically because of the additional transistors required to control each pixel individually. A few malfunctioning transistors out of several thousand render an entire panel useless. The industry has faced a consistent shortage of active-matrix displays in the past, Cooley says. He says the supply has recently increased, however, which means lower active-matrix prices are on the way.

Buying Decision

Regardless of the portable system you're considering in terms of processor speed, hard drive space, and RAM configuration, you're likely to face the active-matrix/passive-matrix choice. Cooley says most manufacturers offer both types of displays on each product line. Aside from the cost difference already mentioned, several points may help you select the display that best suits your needs.

With the cheaper passive-matrix technology nearly matching the image quality of active-matrix, Cooley describes only two types of users for whom he'd recommend active-matrix displays. The first are salespeople toting portable PCs to boardroom presentations around the country. If a group of people will be watching your PC, Cooley says, the wider viewing angle of active-matrix is a necessity.

The second group of active-matrix musthaves are users of high-end graphics software. Fine lines or animation in applications such as CAD software may temporarily disappear on passive-matrix displays, especially single-scan units, Cooley says. Graphics packages and photo-retouching software, Wagner says, mandate active-matrix. Even the mouse arrow can play hide-and-seek on many passive-matrix displays. Frequent portable PC users may grow intolerant of such a distraction.

Though the majority of display discussions center around color screens, Wagner urges users to keep monochrome displays in mind. Though monochrome is found on low-end products, it may cater to some users. Wagner says monochrome displays outdo all others in ease-of-viewing when used outdoors. Construction supervisors or field researchers,

A Table Of Two Technologies
Here's how active- and passive-matrix compare in key areas.

	Active-Matrix (TFT)	Passive-Matrix (STN)
Picture Quality	TFT gets the nod, but the gap is narrowing as STN improves. Graphics software users stick to TFT.	- - - - -
Side Viewing	TFT is tops when several viewers must see the screen.	The security-conscious will like STN's straight-on viewing.
Cost	- - - - -	STN usually costs $600 to $1,000 less. Unless you clearly need TFT's advantages, listen to your budget and buy STN.
Battery Drain	- - - - -	STN by a nose. The latest TFT displays have slightly higher power demands.

Toshiba's Satellite Pro T2450CT, costing between $4,349 and $4,699, features a 9.5-inch active-matrix color display, a DX4 CPU, 8MB of RAM, a 320MB hard drive, and an internal diskette drive.

for example, may thrive with monochrome. Those who connect the portable PC to a monitor in the office, Wagner says, also may adopt monochrome.

"If you use it mostly at your desk, and just travel every once in a while, monochrome is just fine," he says. "You'll get full color (at the office), and those infrequent times when you go on the road, monochrome is acceptable."

Buyers should hurry to the stores if this sounds like a good arrangement. Stephen says monochrome displays are on their "last stand" and will probably disappear from the market by next year.

Even users of color displays should investigate how a portable PC connects to desktop monitors, Wagner says. VGA and SVGA capabilities make little difference on the smaller laptop screens, but when connecting to a 17- or 21-inch external monitor, SVGA capability is a must.

Though we've focused here on displays and though they're the most expensive element of a portable PC, Stephen reminds buyers to consider a computer's entire feature set. In addition to standard questions about internal hardware like the CPU, make sure the system features a practical keyboard and pointing device.

"This is what you're going to be living with day in and day out," Stephen says.

Go to the store and spend time typing and performing other routine tasks on several portable models to find the setup that feels most comfortable. Don't forget to check out the angles at which the screen can be set. The best screens allow a range of adjustable positions rather than just a few, ratcheting settings.

Future Trends

Behind the scenes of the flat-panel display industry, people in white lab coats are furiously working to make FPDs cheaper and more efficient. As in all industries, promises of exciting advances frequently leak to the public. One of the most talked about ideas is field-emitter display (FED) technology. FED displays are a bit like the cathode-ray tubes of desktop monitors, except that FED displays use electron guns behind each phosphor dot rather than a single gun at the back of a CRT. FED prototypes are highly reliable because they use a thousand or more electron emitters for each phosphor dot. While a few faulty transistors can ruin an active-matrix display, an FED display can lose half of its electron emitters and still provide full illumination. FEDs also are promising because of their fast response time, wide viewing angles, and low battery drain. FEDs may make it to the retail marketplace by 1997.

AT&T researchers report encouraging progress in their work with light-emitting, organic semiconductors. The scientists have made light-emitting diodes (LEDs) that provide red, green, and blue light. The LEDs could solve the problem of the expensive process currently used to integrate three chemical patterns in creating color displays. The researchers' LEDs that emit white light could result in low voltage backlighting for portable computers.

While industry watchers and scientific journal readers may thrill at the thought of such advances, most of the Joe Hard Drives in the marketplace are more concerned with what changes they can expect in the next six months or so, when they'll be buying their portable PCs.

Portable displays will follow the trend of all computer hardware in the immediate future. What is today's latest, premium-priced product will be mainstream and affordable to the common buyer in about six months. For example, Cooley says, 10.4-inch displays are near the top of the size/price scale today but will be moderately priced within six months. Stephen says 11.3-inch, and possibly 12-inch, active-matrix displays will be in stores this fall. Resolution will continue to improve, and screen sizes will continue to expand.

Wagner says the price difference between active- and passive-matrix displays should drop to between $500 and $600. The price difference between dual-scan color and monochrome will shrink dramatically enough, he says, to push monochrome displays out of the marketplace.

Compaq's Contura Aero, costing $1,299, features a 7.8-inch passive-matrix color display, a 486 CPU, 4MB of RAM, and hard drive of up to 250MB.

Stephen predicts several significant price declines, especially on active-matrix displays. Dropping prices on Pentium microprocessors and larger hard drives create a buyer's market, he says.

"Put all that together, and you have really good price performance and feature-per-dollar improvement," Stephen says.

The price is right, and the road is calling. Choose your display. ●

by Trevor Meers

Online U:

College Courses By Computer

Education has changed in more areas than the 3 Rs our ancestors studied in the one-room schoolhouse of yesteryear. A one-*world* schoolhouse is the classroom for modern online education. Today, without setting foot on a campus, you can take college classes and even earn degrees through your computer's modem.

Since "exchanging information" is central to any definition of education, and since personal computers have been the vanguard of the Information Age, online education was inevitable. As predictable as the union of education and online communication may seem, the diversity of available courses still will surprise most people. Bachelor's, master's, and even doctoral degrees are all available through online courses taken at home.

Formal education at home is a concept at least as old as the first correspondence classes in the beginning of this century. Although valuable knowledge could be obtained this way, doing assignments by mail was a slow, impersonal education that was often considered second-rate.

In recent decades, distance learning has gone high tech with audio tapes, videotapes, and cable TV broadcasts. These media broadened the educational horizon beyond merely reading words on paper. The interaction of the classroom setting, however, was still missing. Teleconferencing via satellite provided interactive two-way video and audio capabilities. This, however, required expensive equipment, and students still had to travel to a classroom, even if it was a borrowed room much closer than a major university.

Now personal computers promise to bridge the educational gap between university and home. A growing population is capable of going to school in cyberspace. Today almost a third of U.S. homes have PCs,

according to Odyssey Homefront, a national home market survey for personal computers. Half of those have modems and, therefore, the ability to link up to the world. For those who don't yet have a modem-equipped computer, current entry-level hardware costs less than a semester's room and board at any state university.

Universal Student Body

Who would be interested in education online? Most online students are working adults. Most professional careers demand constant learning to keep up with markets and technology. During survival-of-the-fittest company downsizings, employees with the better skills keep their jobs.

Continuing education while working full-time is becoming a greater need. But if you work a full-time job and mind the kids in the evening, how can you afford to go back to college? Enter the online college degree. It's adaptable to your schedule and as close as your phone line.

Another potential audience consists of people, such as those living in rural areas or suffering disabilities, without easy physical access to campus-based schools. Everyone, regardless of location or physical prowess, can access telephone lines (although applicable long-distance charges will vary widely).

Schools On An Online Service

Once you fire up the modem, many online options exist. Perhaps the broadest and most accessible of all online higher education programs currently available is offered by the Electronic University Network (EUN) on America Online (AOL). EUN helped pioneer the use of computers and modems for college study. EUN, which provides undergraduate and graduate credit courses and degree programs, has served more than 14,000 students online since 1983. About 95% of the 1,200 current students are working adults. EUN is not a college or university itself and does not award any degrees.

"EUN makes it unnecessary for every school to re-invent the electronic educational wheel," says Dr. Steve Eskow, EUN President. EUN helps colleges go online and develop courses, provides the telecommunications interface, and recruits students.

EUN is directly affiliated with the following institutions that provide courses and full degree programs online:

- Rogers State College in Claremore, Okla.—associate's degrees
- City University, Seattle, Wash.—bachelor's degrees in more than 20 areas
- Michigan State University, East Lansing, Mich.—an award-winning computer programming course in Visual BASIC
- Edgewood College, Madison, Wis.—management and leadership certificates
- University of Wisconsin-Stout, Menomonie, Wis.—certificate programs and various undergraduate and graduate courses
- Salve Regina University, Newport, R.I.—master's in International Relations
- Heriot-Watt University, Edinburgh, Scotland—master's of business administration
- California Institute for Integral Studies, San Francisco—doctorate in Integral Studies

Even if you enroll in another school, you can transfer credits there using transcripts provided by the colleges and universities in the EUN network, all of which are regionally accredited institutions. You also can accumulate credit by taking EUN's CLEP (College Level Examination Program) courses that use the nationally recognized CLEP examinations. These test scores are accepted by about 2,500 colleges.

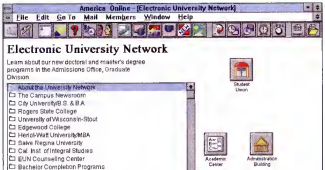
If you earn a degree online, transcripts look like those of conventional degrees. Nothing about EUN or distance learning appears on the transcript, because EUN doesn't provide the courses. If, for example, you take City University courses through EUN, those course transcripts come directly from City University.

Taking A Sample Online Class

What would it be like to take a class at EUN? The first step is deciding what you want to study.

For people undecided about which degree will serve their long range goals, or who already have college credits, EUN offers academic advising services to assess a prospective student's past college work, equivalent courses through the military or employment, national tests, courses from non-accredited schools, and portfolios of published writings or artwork or other special accomplishments.

EUN Director of Student Services Rick Eckel says, "The academic counselors at EUN aren't employed by a school, so they are objective.



The Electronic University Network provides convenient access to the curricula of several colleges and universities.

We also refer people directly to the counselors at each of our schools when that's appropriate. Some of our students find that they can use assessments of on-the-job training or military experience to fulfill their remaining credits, so they're closer to their goal than they expected."

When you know where to start, EUN helps you enroll. There are new courses beginning every month. Some courses are offered on a schedule and others are self-paced.

Courses involve reading texts and study guides, completing formal assignments, and participating in four kinds of telecommunications:

- **One-on-one mentoring online**

You receive individual assignments and mentoring from your instructor. You complete assignments, E-mail them to the instructor, and receive individualized responses.

- **Message-board conferencing**

The Academic Center's course-specific message boards provide opportunities to interact with other students. These work in semester or 10-week cycles, with the instructor introducing and moderating the topics for group discussion. Students also can create their own additional topics.

- **Real-time lectures and conferences**

Instructors have the option to schedule real-time sessions with students. These may be lectures, discussions of current topics, assignment reviews, or special subjects. Because students are in different time zones and because EUN tries to minimize students' online costs, online attendance is optional.

- **Support services**

The EUN virtual campus is modeled after real campuses. The campus includes an academic building, center for continuing education, library, student union, and bookstore.

A bookstore? Haven't computers eliminated the need for books? Contrary to what you might be expecting, computers do not replace books. Although many reference works and sources of information are online, most studying still takes place through the traditional approach of reading print on paper. Books are still more convenient than downloading hundreds of pages of text or reading everything on a monitor.

EUN ships students a number of printed materials, including one or more core textbooks. An EUN student receives the EUN course manual, which is a ring binder containing all non-book study materials. The manual gives study plans, information about the sponsoring college, and exam-preparation information. Students also receive study guides and supplementary printed materials designed by the instructors to accompany the texts. Some courses also will have special video tapes, audio tapes, or computer software.

While computers don't replace books, they can replace classrooms. Teacher-student and student-student interactions take place in cyberspace rather than classrooms. The E-mail to individuals, posted messages and replies on forum "bulletin boards," and real-time conferences form a student's interaction with the school.

It's not as impersonal as it may sound. Although the interactions are not face-to-face, an instructor may electronically give more personal attention to a student than those in large lecture classes often receive.

Cliff Layton, director of advanced technologies at Rogers State of EUN, says, "I think my online students get more . . . attention to their needs than traditional students. I see a traditional student no more than three times a week. Each time class meets, there's only enough time for a few questions so they don't all get to ask questions. Online, I get more questions from more students. I check

my E-mail two or three times a day and respond quickly."

If you dislike the size of lecture classes or feel intimidated by talkative students in discussion classes, cyberspace classrooms are great socio-educational equalizers. The class "size" is only the size of your computer monitor. Classroom communication (sending and posting messages) is as easy as typing and clicking.

If you are interested in learning more about taking online courses, EUN's free "Distance Learning 101 Minicourse" is a good place to start. It covers the basics of online learning and provides a sample online studying experience. In the class, which takes only a few hours to complete and fits into any schedule, you experience several typical tasks: reading and preparing an assignment, working one-on-one with your professor, interacting with classmates, and attending a real-time conference.

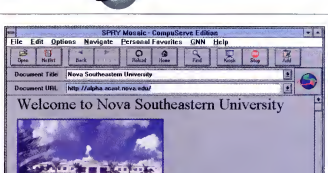
You must belong to AOL to get to EUN, which provides the free AOL software that includes a free 10-hour trial period.

Physical & Virtual Campuses

A growing number of established traditional colleges and universities are putting courses online. Some schools use computers for classes (especially for E-mail between students and professors), but the computer network doesn't extend beyond the campus. Other schools provide access for distance learning students with their own form of bulletin board system (BBS) or, increasingly, links to the Internet.

One example is Nova Southeastern University, chartered in 1964 in Fort Lauderdale, Fla. In "The Oryx Guide to Distance Learning," William E. Burgess says NSU "has become a major force in educational innovation." NSU launched its first distance education doctoral programs in 1972 by periodically flying instructors out to "cluster" meetings across the country and using telephones and mail.

NSU launched its first online program in 1983 with a Doctor of Arts in Information Science program. Other online programs followed at the master's and doctoral levels in computer education, training and learning, information systems, and computer science. In 1995, the online programs in NSU's School of Computer and Information Sciences (SCIS) train more than 700 students in all 50 states and several foreign countries.



Institutions such as Nova Southeastern University combine brief on-campus study with extensive online work.

Except for one to two weeks of "residency" on campus each year, all work is done remotely. According to Professor Jacques Levin in the SCIS department, the master's degrees in 1996 will be down to requiring only a weekend's orientation at the program's beginning.

NSU's "electronic classroom" is the real-time computer conferencing between an instructor and a class of online students. No special software is required on the student's PC since the host computer takes care of the conferencing. Anyone with a terminal program that has VT-100 emulation, which most programs do, can potentially access the electronic classroom.

Besides the electronic classroom, NSU extensively uses instructor-student E-mail. Online students have access to the extensive resources of the Electronic Library that includes a catalog of the physical library holdings, 43 databases, and a number of Internet resources. Students also can access **hypertext** documents (where clicking on a "hot word" takes you to a different section of that document or to a different document) on the Internet.

NSU, unlike many schools on a traditional physical campus, has a large number of students of non-traditional college age. Of approximately 14,400 students, only 29% of undergraduates and 7% of graduate students were under the age of 25 during the 1994 fall term. Most graduate students enrolled at Nova Southeastern are working adults at various levels in their profession. Many have returned to school to upgrade their academic credentials, while others are preparing for a career change. These demographics are typical of students taking online classes across the United States.

Schools On The 'Net

Schools continue to pop up on the Internet, and popular interest in the Internet has exploded in recent years. The Internet is an international network of computer networks that began in 1969 with the Defense Department's ARPAnet (Advanced Research Project Agency) project as a decentralized computer network that could function even after a nuclear attack. After evolving for 26 years, the 'Net's vast information resources are now accessed by as many as 30 million users worldwide.

Unlike commercial services, such as CompuServe or AOL, no one owns the Internet. Its multiple parts and vast resources are much less friendly than the managed commercial services. Surfing the 'Net is both a thrilling and frustrating experience.

If you have full access to the Internet, you could search with a Web browser, a graphical portion of the Internet, for the keywords **distance learning** or **education** and see the many resources available on the 'Net. (Note that although information about many schools exists on the 'Net, most of those schools do not actually offer classes online.)

You also could start surfing the 'Net by visiting the Global Network Academy, a nonprofit consortium of educational and research organizations. Online classes are offered by its various members.

Cyberschool Caveats & Praises

Cyberspace schools offer many advantages. You can take classes from international schools without leaving your hometown, and you often can learn at your own pace and according to your own schedule.

For many people, spending years on a campus is difficult or impossible. For shy people, rural residents, the physically challenged, and forty-somethings who don't relish sitting in

classes dominated by students their childrens' ages, online classes make everyone equal. On the other hand, some college experiences that bring a wealth of non-credit education, such as surviving dormitory life, can never be digitized for an 18-year-old telelearner. Living and learning on a college campus is an intense educational experience on many levels that can never be equalled.

With present technology some courses cannot be taught via modem. A laboratory class, for example, still requires a lab.

Accreditation vs. Diploma Mills

One reason correspondence schools have had poor reputations, even though some schools are good at what they do, is the persistence of diploma mills. A diploma mill essentially sells you a degree for little or no work. Cyberspace certainly is not immune from such dubious educational prospects. Diploma mills cast a bad light on a resume, and if a school is not accredited, transferring credits from it to an accredited school is nearly impossible.

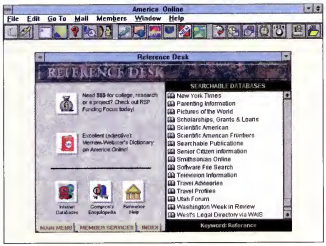
If you are interested in taking only one class to upgrade your skills or to enrich your personal life, accreditation isn't critical. If you are serious about completing a degree online or taking courses that could transfer to another school, accreditation and longevity of a school are vital.

Cyberspace is in constant flux. Cyberschools have already come and gone in the last decade. You certainly don't want your school deleting itself just as you're nearing completion of a degree. Seek a cyberschool with a track record—even in the compressed environment of cyberspace. Although Harvard has existed for two-and-one-half centuries, the oldest schools online have been around about a decade. Ten years is a very long time for *anything* in cyberspace. On the other hand, a brand new online program that is part of an established campus-based university also is likely to be around long enough for you to finish your degree.

If you have questions about the accredited standing of a school, contact the Distance Education and Training Council.

Online Helps & References

Even if you are presently enrolled in a traditional university, there's more than one way to skin a sheep. Online education resources can help get that diploma.



Online reference services, such as America Online's, mean even homework can be done by cyberstudy.

Students always need to do research. The largest collection of online reference materials among the commercial services is on CompuServe, which offers a number of dictionaries, encyclopedias, and almanacs. Many more specialized works include Peterson's College Guide, Hoover Company Database, Consumer Reports Complete Drug Reference, Books in Print, Marquis Who's Who, and Magill's Survey of the Cinema. Hourly information on stock prices, weather forecasts, and other news is available with a few clicks of a mouse.

For the latest information, thorough researchers need to see what periodicals say about their subjects. CompuServe has online versions of magazines and databases on thousands of periodicals. You can search to find article titles, and if you wish, (for a fee) download the texts of the articles (where available). A modest fee and a matter of minutes online can save you many hours of scanning through the Readers' Guide to Periodical Literature and microfilm in the campus library.

Your topic of interest also may relate to one of CompuServe's hundreds of special interest forums. You can discuss topics with users, including experts and lay people, from around the world.

If you can't find an appropriate forum on CompuServe, you surely can find something to your liking on the Internet. Never-ending information on topics ranging from agriculture to zoology is digitized on the 'Net. Interested in gardening? The Internet has horticulturally inclined groups and databases devoted to everything from annuals to Chiá pets to woody plants. The main problem with information on the Internet is its abundance. Wading through it all to find those perfect knowledge nuggets can be challenging but addictive.

Earning degrees and taking courses takes commitment and money. Perhaps you like learning new things for its own sake. Informal education is online for the taking. If you are hungry for knowledge and don't care about credits or diplomas, a lifetime's worth of learning is accessible online for little or no money.

As more people must upgrade their skills to keep old jobs and win new ones, as computers expand into more aspects of life and work, and as the cost of traditional education rises, online education will become even more prevalent in the future. ●

by Mark D. Stucky

For More Information:

America Online
(800) 827-6364
(703) 448-8700

CompuServe
(800) 848-8990
(614) 529-1340

Electronic University Network
(800) 225-3276
(503) 482-5871
Keyword "EUN" on America Online

Nova Southeastern University
(800) 541-NOVA (6682)
(305) 475-7300
Internet: http://alpha.acast.nova.edu/

Global Network Academy
Internet: http://uu-gna.mit.edu:8001/uu-gna/

Distance Education and Training Council
(202) 234-5100

Embracing Virtual Reality

Have you ever attempted to overcome a fear of heights—without leaving the ground? Or dissected an airplane engine—without getting greasy hands? Or performed major surgery—without spilling a drop of blood? This is the spot where you'd expect to see the AT&T plug, right? You won't; we're talking about virtual reality.

Virtual reality, or VR as it's often called, usually is considered a futuristic endeavor. But its time appears to have arrived. While you personally probably aren't using virtual reality, it's being used daily in some segments of business. Whether virtual reality continues the early promise it has shown and eventually joins the mainstream of society has yet to be decided.

The general public commonly sees virtual reality through the entertainment industry, in media such as movies and television. Several "virtual reality centers," aimed mainly at game players, have opened in the United States and Japan. But, just as computers did in the early 1980s, virtual reality is beginning to mature beyond simply providing a surreal game-playing arena. Many small companies are pioneering the migration of virtual reality into society's mainstream.

What types of endeavors lend themselves to VR? We'll consider some of the newer uses of VR, excluding entertainment. We'll also look at the future of virtual reality and how it will affect you in a few years.

What Is VR?

As virtual reality increases in popularity, more products will claim to support and contain VR in a trend similar to the recent influx of multimedia claims among hardware and software products. What exactly is virtual reality, though?

"(People think) virtual reality is where you hook yourself up to the equipment, and you're gone somewhere," says Kevin Teixeira, virtual reality program manager for Intel Corp. "The equipment is the thing most people remember. But the real key is the software. . . . VR is really about interactive, real-time animation."

The **virtual reality** definition we found most often involves a minimum of three components: three-dimensional graphics, immersion, and interaction. **Immersion** means the experience completely absorbs the user; outside noises and sights should be blocked. **Interaction** means the user can make decisions within the program's environment that alter the way the program reacts.

Medical Uses

The medical community's quick acceptance of virtual reality is one of the industry's biggest surprises, says Teixeira, who coauthored the book "Virtual Reality: Through The New Looking Glass" with Ken Pimentel in 1993. They wrote a second edition earlier this year.

"Both Ken and I, back when we were writing the first edition, (were saying), 'This medical stuff, it'll be end of the decade,' " Teixeira says. "Yet, with all of the pressures and interest groups trying to streamline and improve the efficiency and productivity of the medical industry, data visualization is one area that apparently is ripe for that kind of improvement. . . . There are a number of companies making a run at simulations."

One such company is High Techsplanations Inc. of Rockville, Md. The company started in 1987 as a film/video production company, and in 1990 it began researching the possibility of using virtual reality with surgical simulations.

After developing a number of virtual reality projects for pharmaceutical companies (who use the simulations in marketing programs), High Techsplanations will ship its first medical training program in August. The program will be an intravenous starter simulation for the state university nursing program in New York.

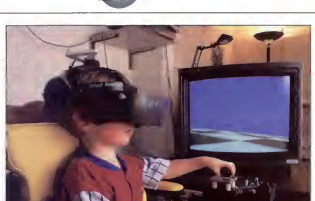
The key to the simulators is software, called *Teleos*, that realistically represents organs and soft tissues, not only visually but also in their reaction to objects. Each surgical instrument causes a different reaction when used with a certain type of tissue or organ.

Widespread implementation of such simulation training will save lives; most surgeons and medical personnel now must learn on the job, putting patients at risk.

"In angioplasty, for example, they go in a couple of times, if they're lucky, on a pig or a lab animal," says Martin McGurn, High Techsplanation's director of business development. "The anatomy is totally different. They really don't learn that much, and then they go in and do it on a human. . . . There's really the need for a realistic training environment, and that's what we're trying to provide."

While VR can help doctors learn to take better care of patients, it can be involved directly in curing them as well. Division Inc. of Chapel Hill, N.C., joined Dr. Ralph Lamson of California's Kaiser-Permanente Medical Group to help patients overcome a fear of heights. The study exposed 44 volunteer patients to a VR world in which they walked from an elevated patio across a plank and onto a bridge. They could look over the bridge's rail or stand at the edge of the plank. Doctors monitored stress and anxiety signs and compared them to the same signs the patients exhibited during encounters with actual heights. After successfully maneuvering through the VR world, patients conquered their fear of heights in the real world at a 90% success rate.

"It gives many of the visual cues and effects you get from actually dealing with heights, but you also know in your head that you're not really up in the air," says Doug Schiff, vice president of marketing for Division. "They were reacting just as they would in a real situation. Their heart rate was up; their blood pressure was up; they were sweating; they were truly frightened. At the same time, they were able to do it, which they would not be able to do in the real world. So when they were done, they felt like they had conquered that fear."



PETE CHAPMAN

Children learn to operate a motorized wheelchair using a virtual reality simulation at the Oregon Research Institute.

Training Uses

Training is an area in which virtual reality will have a major impact, according to Greg Panos, who runs SophisTech Research, a Lakewood, Calif., publishing company that focuses on virtual reality and publishes the "Virtual Reality Sourcebook."

"I think we'll see a lot of uses in the area of training eventually," says Panos, who also teaches at Cal-State Long Beach and does VR consulting for several entertainment-based businesses. "Driver training, construction site monitoring and maintenance, security applications, information navigation. . . . (Those are) very practical applications."

At the Oregon Research Institute in Eugene, Ore., orthopedically impaired children learn the motor skills necessary to operate a motorized wheelchair. Not only does the training help the children become more self-sufficient, says Ken Loge, implementation coordinator and designer at the institute, but it gives them a sense of accomplishment and pride.

The children advance through three VR worlds as their driving skills increase. In the most difficult world, they must cross a simulated street complete with pedestrian signals and traffic. The children's favorite feature, though, is the ability to fly off the edge of the "earth" and move into outer space. Through the VR world, they enjoy a freedom of movement and independence most have never experienced.

"It's very exciting for them. It's motivating, and it's safe," says Loge, who designs and programs the VR worlds used in the simulation. "We can combine all of those things in one package and expose them in a controlled environment to the things they need to learn for safe community movement."

Business Uses

Division Inc. is working with numerous businesses to develop VR simulations. Division created a simulation of a Gulfstream aircraft cabin for use at a trade show. Because Gulfstream couldn't bring the 45-foot airplane onto the show floor, the simulation was needed so the company's customers could tour the aircraft's interior. Customers using the simulation were able to test the cabin's table, which converts into a computer desk, or turn on lights and music in the cabin.

Division also teamed with McDonnell Douglas to use virtual reality in aircraft design. Because airplane maintenance is so important, McDonnell Douglas must make sure its engine designs are workable for mechanics and engineers. The aerospace product manufacturer uses VR in the early portion of engine and engine compartment design to ensure ease of maintenance. Use of VR should save the company money by lowering the number of physical prototypes needed and by providing easier design testing.

Division's translation software, called *dVISE*, is the key to its ability to create realistic models, Schiff says.

"Since most anything of that nature—planes, buildings, manufacturing plants, automobiles—is designed on computers anyway, we have translators that can take that original CAD (computer-aided design) data and convert them into our own format," he says. "We work with the customer's original data. We don't have to go

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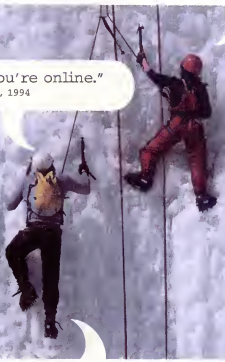

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designing that plane from scratch. . . . It's beyond visual realism. It's accurate. For example, when McDonnell Douglas uses it, they're checking for clearances for wheel components. We could only do that if we were using the real data."

Using VR

Despite the increased use of VR in business, entertainment clearly is the most common current use. For Intel's Teixeira, his favorite current VR offering is an animated world created by Disney using the latest virtual reality technology and hardware. Visitors at Disney World's Epcot Center in Orlando, Fla., take a VR ride on a magic carpet through the setting of the animated movie "Aladdin" and interact with the movie's characters in real-time.

"You are *in* the movie," Teixeira says. "It's so beautiful. I've seen a lot of VR systems, and it's always, 'This is nice.' But this was gorgeous. It's as if somebody had speeded me up in time five years, or that's at least what I had thought it would take to get to something like this. . . . To me it was like the light down at the end of the tunnel of what virtual entertainment could be."

While entertainment is a vital component of virtual reality, Loge of the Oregon Research Institute says VR's biggest potential for growth is with other types of applications.

"So many people are doing games, and that's fun, but you can actually do real stuff with it," he says. "It's amazing how fast the whole thing is growing. Hopefully, people will continue to have good ideas, otherwise it's just the same garbage in 3-D. If people have really solid ideas, they can do so much more with it."

With virtual reality today, the biggest obstacle is the physical world; many ideas simply are waiting for the hardware and software to catch up. The future of virtual reality, though, is mind-boggling. Designers constantly are dreaming up new uses; businesses steadily are joining the ranks of VR believers. VR's potential is limited only by our imaginations. Not even the physical world can put a boundary on that. ●

by Kyle Schurman

Virtual Reality In The Future

Thinking about virtual reality in the future tense is easy for most people, because VR has a futuristic/science fiction connotation. According to those who study the industry, though, the future—where virtual reality could become mainstream—is fast approaching. During the next few years, VR is poised for a strong move . . . perhaps through the front door of your home.

As VR hardware continues to become less expensive and easier to obtain, the technology will become more mainstream.

"Today, there are a lot of standard, off-the-shelf components you can buy and software you can buy that you can put together (a system) yourself," says Greg Panos of SophisTech Research. "That shows, through the maturation of the commercial aspects of the industry, it is moving along. In 10 years, it'll be completely ubiquitous, just like television at this point."

VR Uses

Here are some potential uses for virtual reality that may affect you around 2000—or sooner.

Chemical Synthesis: Scientists, using haptic technology, are combining molecules in a VR world to create chemical simulations. (Haptic technology involves physical sensors that generate a sense of touch at skin level and generate force feedback information for muscles from within a VR world.) Scientists use knowledge gained during the simulations to create a substance, such as a drug, in the real world. "Some of these may be the cures for cancer, or perhaps even diseases more horrible than we can ever imagine," Panos says.

Education: Construction of VR worlds, used in connection with a school's curriculum, could enhance the learning experience and rekindle a desire to learn for students. "Educational applications are where the average person is going to encounter virtual reality," says VR author Kevin Teixeira.

Internet: Virtual reality can be added to Internet interfaces to make the 'Net a true "cyberspace" into which people can travel, according to Teixeira. "People really are rushing to the 'Net, and the 'Net is really changing the industry," he says. "By adding 3-D, interactive graphics, it will sustain its momentum."

Law Enforcement: Court cases, and the way the jury considers information, could undergo a revolution. "If it (had happened) 10 years into the future, the jurors in the Simpson case all would have immersive interfaces on, going through all of the various scenarios and potential situations that took place" at the murder scene, Panos says.

Personal History: VR could document human existence, creating a simulation of you that represents your experiences. "It's really going to become much more mainstream, almost to the point like photography is," Panos says.

Shopping: You'll be able to "walk" through 3-D stores, grabbing objects that interest you and obtaining additional information. VR shopping probably won't gain complete acceptance, though, Panos says, because some people view shopping as entertainment, and they'd rather interact with other people in the real world.

Can VR continue its recent growth pattern? Businesses hold the final vote on whether it succeeds or fades, says Doug Schiff of Division Inc.

"If it saves companies money . . . ultimately, that is what will decide whether virtual reality is commercially viable," he says. "Companies don't invest in new technology because it's neat. They invest because they believe it will improve their competitiveness or their bottom line."

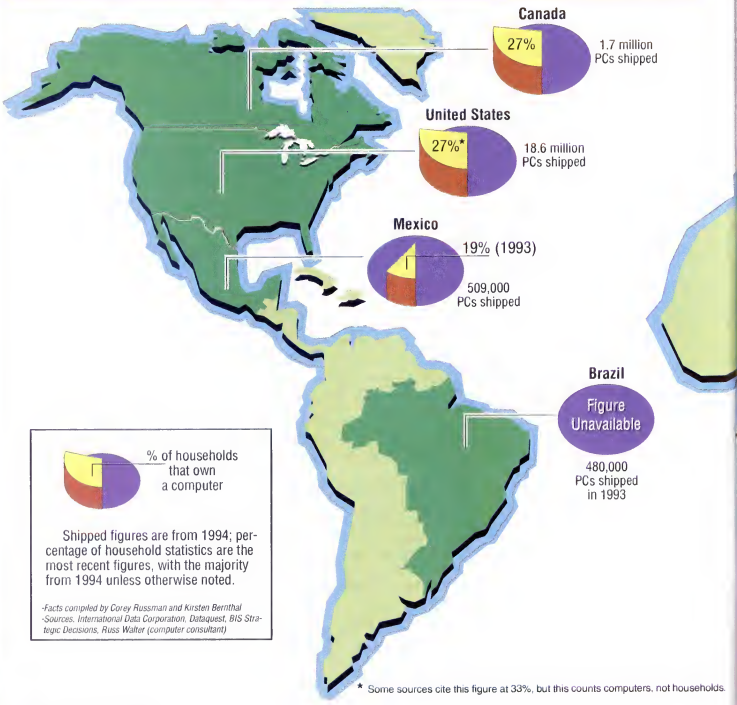
Like any technological breakthrough, there's always danger that it will be used for the wrong purpose. Panos says VR worlds aren't a guaranteed safe haven from the problems of the real world.

"There's the glory and the horror of our future at hand, and I mean literally at hand, because it will be the hand of someone who will create these worlds and manipulate these worlds before our very eyes," Panos says. ○

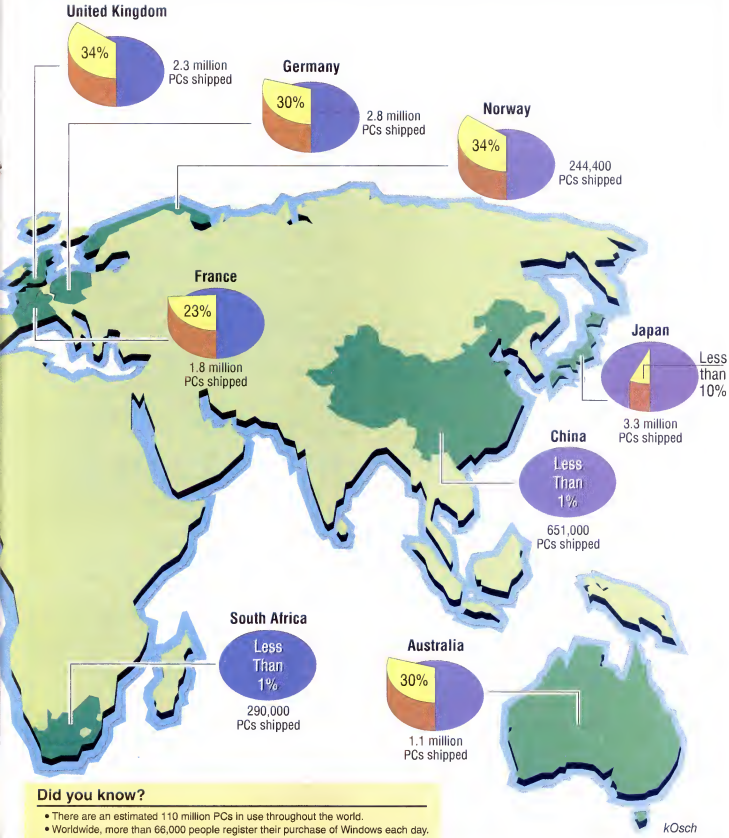
PCs Around The World

We all hear how rapidly the personal computer industry is growing, but few of us know exactly how fast. With rapid advances in technology and ever-changing hardware, software, and monitors, we often find it hard to keep up with the latest changes.

The bottom line? The PC industry is booming and not just in the United States. The statistics found on these pages are meant to help you get a grip on the growth of the worldwide personal computer industry. We hope you will find this information as useful and interesting as we did.



* Some sources cite this figure at 33%, but this counts computers, not households.



Did you know?

- There are an estimated 110 million PCs in use throughout the world.
- Worldwide, more than 66,000 people register their purchase of Windows each day.
- An estimated 47.8 million PCs were sold worldwide in 1994.

kOsch

Need some help with your hardware or software?
Looking for simple explanations on technical subjects?
Send us your questions!

Operating Systems

Q: *I have a Colorado Jumbo 250 tape backup drive and use version 4.04 of their DOS backup software. Basically, it works fine. But when I back up a very big drive that has many directories (412, to be exact), the software spends about five minutes running the hard disk* ***before*** *it actually starts backing up to tape. At first I thought it was hung up and would reboot, but I finally learned that if I waited long enough it would finally get going. From Colorado technical support (and the manual) I learned that when the directory tree is too large to fit in memory, the backup software creates a temporary memory swap file on my disk to read and manipulate from, and that's the extra time I'm seeing. I also was told that if I had expanded memory (EMS) available, this would make it less likely that the software would need a swap file. So I used the EMM386 command in Config.sys, and a special floppy boot disk just for running backups, to create some EMS memory. I used the command DEVICE=C:\WINDOWS\Emm386.exe ram.*

The puzzle is this: I have 8MB of RAM and according to my MEM command I have 7MB of EMS (expanded) memory available at the start of a backup. Why is the Jumbo software still swapping the directory to disk? Colorado told me that even though I have 7MB of EMS, their software still will swap to disk, but frankly that doesn't sound right to me.

A: You're barking up the right directory tree. But your Colorado tape backup software needs to be told that *now* you have EMS memory available. When you first installed it, it looked around, didn't see any EMS-type memory and decided you have none; so now it's not bothering to try to use all that lovely EMS you created for it. If you activate your EMS and re-install your backup software, you should see the results you want. Or, you can manually "tell" it to use EMS.

1. Go to the tape backup main menu.
2. Select Hardware.
3. Record all the settings from the screen and exit.
4. Go into the \TAPE directory and run the CONFIG utility.
5. Do a Manual setup of the hardware, re-enter all the settings you just copied, and choose the "use EMS when available" option.

Q: *I'm in the process of setting up a system of faxing bulletins to sales prospects. Can you tell me: What dpi (dots per inch) is usually found in most fax machines? Does it require a shorter time to fax at 72dpi than at higher dpi? When faxing all line-art or type will 72dpi be fairly clear? We will import the art into Ami Pro. Should we use different software to create a higher quality image on the fax machines?*

A: 72dpi isn't a resolution found in fax machines. The common resolution (called "standard") on fax machines (and fax cards in computers) is approximately 100dpi vertical by 100dpi horizontal. This isn't too bad for line art or clear text that is more than, say, 12 point typeface.

You didn't say whether you're talking about faxing with a fax board in your computer or a desktop fax. Faxes sent from inside a computer with a fax board usually look much better than the same fax sent from an ordinary fax machine—even if they're received and printed by a regular fax. You see, on a regular desktop fax the material is optically and mechanically scanned before it's electronically transmitted, and that step, unless the optics and mechanics are perfect, introduces flecks and distortions. Faxing a letter from, for example, any Windows word processor via a fax board in the computer bypasses the entire optical/mechanical scanning. The particular word processor or graphics program you use to fax from will make little difference. However, virtually all fax machines and computer fax boards also can send and receive at "fine" resolution of about 200dpi vertical by 100dpi horizontal. This definitely looks clearer.

The downside is that it takes twice as long to send, doubling your phone bill. A few newer fax machines can send and receive at "superfine" resolution (about 400 x 200) but this takes eight times as long to send as standard resolution and won't improve anything unless the receiving machine also is capable of superfine resolution. There are a very few special Group 4-type fax machines around, which send at laser-type quality and do so very quickly over special ISDN phone lines. These are rare right now and used primarily by international companies that need to send high-resolution materials very quickly. "Gray scale" images (such as photographs) don't transmit well over regular fax machines regardless of resolution. Some fax machines have a "gray scale" feature on their resolution settings, but that helps only if the machine on the other end also has a similar special feature. Faxing such gray scale images from software with a fax board works better than a conventional fax machine, especially at fine resolution.

Utilities

Q: *In the backup program that came with DOS 6.22 there's an option about what "type" of backup to run. The one called "Total" is pretty clear, but the two called "differential" and "incremental" confuse me. What's the difference between them, and what are they used for?*

A: Good question. The differential and incremental backups give you a way to keep your system completely backed up without having to back up the whole thing every day. (Since DOS 6.2, the same options are available in the Windows and DOS versions of DOS's backup software. These options exist in all backup software, but they aren't always called "differential" and "incremental.") These options are particularly important if you don't have a tape backup; doing a "full" backup of an 80MB drive would take about 40 minutes and 40 floppy diskettes. As a sad result of that, most folks don't back up often enough, believing that it takes too long. Even sadder, if they knew how to use these special backup modes, they'd be shocked to discover most folks can do a "complete" backup every day on one or two diskettes, in about two minutes!

Both differential and incremental are fairly meaningless until you have *first* done one "full" backup of the whole system. They both refer back to your full backup, and try to make sure that stuff added or changed *since* you did the full backup gets backed up in the following days and weeks. There's no way to avoid doing that one big backup once.

Once you've done at least one backup (though two is preferable), the other two types are a superfast way to keep your backups current. In a "*diff*erential" backup your software backs up only those files added or changed since the last *full* backup (that is, it looks for the *diff*erence). The advantages of a differential backup are that:

- it may take only a few diskettes (or a tiny bit of tape) and a few minutes, even on a loaded 800MB hard disk.
- differential backup, unlike a person trying to manually copy "just the important files," never misses anything, no matter how small or apparently unimportant; it knows what's been changed or added and it backs it up.
- using your most recent differential backup disk together with the last full backup provides *total* protection; every piece of lost data or programs could be restored to its current state using just your last full backup (even if it's six months old) plus your most recent differential backup.

Incremental, on the other hand, backs up everything added or changed since the last backup, *regardless* of whether the last backup was complete or partial; typically, an incremental backup copies only the files you added *today*. With differential backups, if you hadn't run a full backup in four months, you'd have to keep four months worth of daily incremental backups. In contrast, an *incremental* backup catches *everything since your last full backup*, even if that last full backup is, for example, four months old. It's a little confusing, but this is one case where the fine print makes a very big difference.

There are a few situations where differential backups won't work well. If most of your hard disk is occupied by, for example, a massive 150MB, 200,000 item database, changing even one item in it means the whole thing has "been modified" and the whole thing gets backed up even during a differential backup, thus losing the elegant speed advantage of the differential backup. Often-modified graphics files and installations of large, new programs can raise the total of "modified" disk space—unacceptably bloating the differential backup time. In those cases, you'll probably need a full (tape) backup everyday.

There is one minor annoyance. For example, if you're restoring from a combination of a recent differential backup plus a four-month-old full backup rather than a current full backup, you could be restoring old files and programs that you cleaned out since your last full backup.

General Computer Hardware

Q: *I have a two-year-old 486DX2/50 from Gateway. It has 8MB of RAM, a 250MB hard disk, and an ATI Ultra Pro video card. I notice a few games are recommending that users have a Pentium. I was told my 2/50 can't be upgraded. Is there anything I can do to bring this computer up to speed? Would it pay to add 8MB of RAM or change to a 64-bit video card? Or will the 2/50 CPU continue to be a handicap?*

A: We hate to comment too far into the future because our industry has a sneaky way of outstripping predictions. But as for the next year or three, your computer is far from being a dinosaur. You could double the disk size with *Stacker* or DriveSpace. You can buy Intel's DX4/75 OverDrive chip for about $160, but the performance gain in your case would only be about 30%. The Pentium OverDrive would buy about 20% more speed than the DX4 at a $400 street price. But adding that sort of speed doesn't really let you do anything you couldn't do before. Gateways that year had motherboards with VESA Local-bus (VLB) slots or older ISA slots. Whether yours has VLB goes to the heart of your question: If you don't have VLB slots, that lack—and not the CPU— will be a handicap.

VLB lets you add faster video cards and faster drives; one of the biggest performance gains you can buy would be a newer Enhanced-IDE hard disk (sometimes called "Fast ATA"), which, with a properly matched controller card, would more than double disk speed. If you're doing graphics intensive stuff such as CAD or high-end paint or image manipulation (or simply find scrolling painfully slow) you could spend around $150 to $200 for a 64-bit VLB graphics card that would significantly speed up graphics. Be sure to get a card with 2MB of RAM (a 64-bit card with 1MB only operates in slower 32-bit mode.) Without VLB, you have limited graphics or disk upgrade possibilities. If you currently don't have a "RAM shortage," adding more won't help much; if, however, you're thinking of running Windows 95, you'd benefit from adding 8MB. If you want to upgrade everything, you may do better selling the old machine and buying a new one.

Q: *I have a 33 MHz 386DX and a 16MHz 386SX. I've upgraded them with bigger hard disks and more RAM, but they're still slow. I see ads for OverDrive CPUs for 486s but not for 386s. Are there any for my board or should I junk the motherboard?*

A: There are a number of products to upgrade 386 boards to low-end 486-capabilities. They'll double or triple some of your performance, but not as much as, for example, a true new 33MHz 486 motherboard. The problem is cash: Most upgrade chips/modules cost $200+, yet you can get a whole 33MHz 486 board for $250. The exception: A few small vendors do sell Cyrix upgrade chips below list price, so price may make

General Computer Hardware

sense. Try Upgrade Specialties (806/796-1675). They carry upgrade CPUs for most any 386SX (16MHz to 25MHz) or DX386s up to 40MHz.

Printers

Q: *Will adding more memory to my Hewlett-Packard IIIP laser printer make it print any faster or, at least, act as a buffer and get my print job out of the computer faster?*

A: It's not an academic question: If what you suggested works, it would pay for millions of folks with 1.5MB HP IIIP printers to run out and get another 2MB—even if they're not getting any "out of memory" messages while they're printing graphics. (Buffer memory in a printer accepts a print job and lets your computer get back to work faster.) If it wouldn't work that way, you'd be wasting money. Unfortunately, most lasers—including yours—don't use their memory as buffer. Even in the few (namely a few newer HPs) that do use their "extra" internal memory as a buffer, the buffer usually spools (accepts) a job, but slows down its printing until the whole job is received. Thus, if you print something bigger than the buffer, it prints slowly. There are reasons to add RAM to a laser printer, but speeding up print jobs or regaining control of your keyboard sooner aren't usually among them. You'd do better adding RAM to your *computer* and getting printer spooler software such as *Power Pak* (PC-Kwik, 800/284-5945; 503/644-5644, $70) or *Hurricane Utilities* (Helix, 800/451-0551; 718/392-3100), or *SuperPrint* (Zenographics 800/366-7494; 714/851-6352 x224, $56). All three work in Windows; if you use DOS a lot, too, try *PrintCache* (510/420-8777, $50) .

Q: *I'm using a Packard Bell Legend 127, 486SX25, and an Okidata ML380 printer. After upgrading with an Intel SX20DP50 OverDrive chip I'm now unable to print from Windows—only from DOS. Packard Bell technical support was no help, saying only that it's a software problem.*

A: If it is a software problem, you may need a new Windows printer driver. This sometimes happens if the older driver is speed sensitive and can't handle the new speed of the upgrade processor. (Old programs do sometimes choke up at the higher speeds of a new CPU.)

To verify what we suggest, try two tricks to temporarily slow down your computer. If either "cures" the problem you can be *sure* we're right. The first trick is to press your TURBO button so that it's in the "off" position. The second trick is to temporarily disable the external cache in your system's BIOS "setup" routine. This is a little trickier to do; before you start, read "Changing Your Computer's Battery" in our March 1995 issue, where we covered working with BIOS settings.

You also can try temporarily changing your Windows printer driver. To do so:

1. Click on the Control Panel in Program Manager's Main group.
2. Double-click the Printers icon in Control Panel.
3. Press the Add button and select the printer called "Generic/Text-only".
4. Press the Install button.

If the problem goes away, get a new driver. (You may want to go ahead and get one anyway—it won't hurt.) To see what driver is active now, open the Settings menu in Control Panel and select Printers. In the Printers dialog box, click on the Setup button; in the next dialog box, click on the About button. To get a new printer driver, contact Okidata or Microsoft (the appropriate numbers can be found in your hardware's documentation).

Q: *I recently got an HP LaserJet 4L, but I'd like to keep my Epson dot matrix printer hooked up. I'd prefer not to hook both of them up to my LPT1 printer port/plug using one of those A/B switchboxes. But the salesperson advised me against adding a second parallel printer port; he implied he'd received lots of complaints about them not working. What's the story?*

A: There is no reason why you can't install a second parallel port. The problem, though, with hooking two different printers up to an A/B switchbox isn't just the inconvenience of reaching over to click the switch (we're not that lazy); but each time you change printers you have to "tell" your software to use a different printer driver. Sometimes that's tedious.

Aside from printers, you can use parallel ports for high-speed data transfers between laptops and desktop computers (without having to unhook the printer), for external CD-ROM drives, and external tape backups. Unlike serial ports, things plugged into parallel ports usually run right out of the box without a lot of puzzling.

Some retailers are uninterested in selling parallel ports. A card with just a parallel port on it costs only about $12 (which may be why they don't push them). If you want to get a superfast Enhanced Parallel Port (EPP), you'd have to shop around and pay more, but even the cheap ones are fine for what you want. You, or the dealer, do have to set the DIP switches on the new card before installing to "tell" it that it will be LPT2 and to run on IRQ5. To test that it's working properly, before leaving the dealer (or, if you're doing it, before closing the computer case), plug printers into LPT1 and LPT2. At the C> prompt, type:

```
type c:\autoexec.bat > LPT1
```

and press ENTER. Do the same thing for LPT2. The print should come out where you've "directed" it. (If the cards are set up wrong, the print job might come out of both printers simultaneously, not print at all, or act in way that indicates an obvious mismatch.) Adding a *third* port (LPT3) is trickier. To make a long story short, it's tough to have three ports without having some confusion between them.

Communications

Q: *Whenever my computer is on, its internal modem "answers" every phone call. The modem and phone share one phone line, so my callers hear a 30-second, high-pitched squeal and they hang up. I had a similar problem with my Prodigy setup, and someone gave me a command that's supposed to reset the modem so it won't answer the phone: "ECHO ATS0=0 &> COM2" or something. Is this right, and where do I enter it?*

Communications

A: Most modems are "Hayes compatible," meaning they can be controlled by characters called the "Hayes command set." The modem's booklet—which no one reads—lists these weird looking, but occasionally useful, little buggers. Since most programs using modems send these commands to the modem for you as needed, there's little need to know modem commands. In your case, you need the command "ATS0=0", which tells your modem *not* to answer. (You also could try "ATS0=20", which tells your modem to answer only after 20 rings.)

Next, use the DOS EDIT command or Windows NotePad to add this line *anywhere* in your Autoexec.bat file:

```
echo ats0=0 > com2
```

"ECHO" sends "ATS0=0" to the screen (type **echo hello** at the DOS prompt to see what we mean). The ">" is a DOS trick to redirect something that normally goes to the screen somewhere else; instead of the screen, the command goes to COM2 (the COM port your modem is set to).

Or, you could buy a $50 to $100 phone-line sharing box. These are great if you're sharing one phone line with a phone, answering machine, fax (or fax card), and modem. They'll direct incoming calls to the right place.

One caveat: Some combination modem/fax cards claim to have the ability to do "intelligent line-sharing," meaning they know what to do with calls, whether they're fax, voice, or modem calls. That's a different game and requires studying the board's manual for how to turn off the squeal.

Word Processing

Q: *Importing ASCII text files works fine using Ami Pro 3.01. The only problem is that its "ASCII Options" dialog settings seem to work opposite from what they imply. For example, when I select "CR/LF at lines," text is imported with many lines flowing nicely to the Ami Pro margins and with carriage returns occurring only at paragraph ends. This is usually what I want, but not what the setting implies. When I select "CR/LF at paragraph ends only" I get text imported with carriage returns occurring at the end of each line of the ASCII file. This seems backwards.*

A: "CR" means "carriage return" and "LF" means "line feed." Those settings can be confusing, but, as the help screen says if you read it carefully, the settings describe the *incoming* file, *not* the way you want the file to end up. "CR/LF at lines" assumes that the file has a CR/LF at the end of each line and two of them at the end of each paragraph. It strips out all single CRs, which turn consecutive lines into a paragraph, and leaves a CR only at the end of a paragraph (which was originally marked by two CR/LFs).

If you specify "CR/LF at paragraph ends only," you're telling Ami Pro that all the CR/LFs in the file are at the ends of paragraphs, so each line that comes in (which ends with a CR/LF) comes in as a separate paragraph. Once we understood that the settings were for the incoming file, not how the conversion is to be, we didn't have any problems (but still thought it was backwards).

Q: *I have a Panasonic KX-P4430 printer, which I use with Ami Pro 3.1. Per the manual, I put in bullets using Edit/Insert. Everything looks perfect. But everything prints except the bullets. If, for example, I do Edit/Insert/Date, that works fine. What's going on?*

A: We've run across this before. One solution is to turn on the Print TrueType as Graphics setting in the printer driver itself. When in Ami Pro, this is done by opening the File menu, selecting Printer Setup, then Setup, then Options. Turning off the Print in Background setting also may help. To do this, open the Tools menu, select User Setup, then Options. You should be able to reliably print bullets.

Two caveats: (a) if you turn on the Print TrueType as Graphics setting, you *may* find that when you're printing very full pages your printer says "out of memory"—even with pages that previously printed perfectly; and, (b) if you turn off the Print in Background setting, you may find that printing seems slower.

Q: *How do I change the default font in the Windows Write word processor to something other than Arial? There's apparently no provision in Write itself for setting the default font.*

A: Check whether the font you want to use is a TrueType font by looking for a little "TT" symbol to the left of the font name. If it is TrueType, use NotePad to edit your Win.ini file and look for the [fonts] section. Write will use the first TrueType font it finds listed there. Normally, this is the Arial font (listed as "Arial (TrueType)=Arial.fot"), but can be changed to any other TrueType font.

If you want to have a *non*-TrueType font as the default:

1. Start Write and set all the settings (i.e., fonts, borders) as you want them to be upon startup.
2. Save this file under the name Default.wri.
3. Go to Program Manager, find the Write icon, and highlight it.
4. Open Program Manger's File menu and select the Properties option.
5. In the Command Line box, type **write.exe default.wri**

The next time you open Write, your default settings will be in place.

A piece of advice: Write-protect Default.wri to avoid accidentally saving something on top of it. To do that, open File Manager, find the file Default.wri., and highlight it. Open the File menu, select Properties, and click on the box marked "Read Only." ●

Get straight answers to your technical questions. Ask PC Novice! Send your questions to: PC Novice Q&A, P.O. Box 85380, Lincoln, NE 68501. (Volume prohibits individual replies.)

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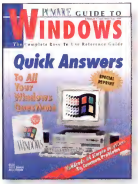

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GLOSSARY
Of Terms

Active-Matrix Display—A type of portable PC display in which each pixel features its own transistor, allowing excellent picture and color control. Active-matrix is the best, and most expensive, quality of portable display. Also called thin-film transistor (TFT) display.

Autoexec.bat—A special file containing instructions that are carried out every time the computer system is started or restarted. These instructions help the computer get set up and find certain programs.

CPU—Central Processing Unit. The "brain" of the computer. The type of CPU, or microprocessor, that a computer has determines what type of system it is. The 80386, 80486, and the Pentium are all processor chips, or CPUs.

CD-ROM—Compact Disc, Read-Only Memory. A data storage medium that uses laser optics rather than magnetic means to read data. Information can be read from CD-ROMs but not recorded on them.

Config.sys—A text file DOS consults at system startup. This file contains commands that tell DOS how to communicate with new hardware, to customize communication with existing hardware, or to adjust your computer's memory usage.

Delay Before First Repeat—How long it takes the computer to repeat a character after you press and hold the key down.

Device Driver—Software that lets the computer communicate with hardware devices, such as a mouse, printer, or audio speakers, or other software.

Disk Cache—A memory area containing information read from or waiting to be written to a disk. Access is faster in the cache than a disk since stored data can be read quicker.

Double-Click Speed—The rate at which Windows registers a double-click of a mouse button and executes a command.

Dual-scan—This technology, found in most passive-matrix displays, lets light pass through the pixels at twice the speed of single-scan, increasing the refresh rate and making a better picture.

Immersion—A virtual reality experience that completely absorbs the user, blocking out outside noises and sights.

Interaction—A virtual reality experience in which the user can make decisions within the program's environment that alter the way the program reacts.

Megabyte (MB)—A common measurement of computer storage equaling approximately one million bytes.

Megahertz (MHz)—Used to measure a system's speed. One megahertz is equivalent to one million cycles per second.

Modem—A device that lets a PC communicate and exchange information with other modem-equipped PCs over telephone lines.

Online Service—A dial-up service that provides news, information, and discussion "forums" for users with modem-equipped computers.

Operating System—The software that controls your system and provides the basis for all other software you run on it. Examples of operating systems are DOS and OS/2 for IBM-compatible computers and System 7 for Macintosh computers.

Passive-Matrix Display—A portable PC display in which a grid of transistors controls many pixels simultaneously. The picture is less crisp than active-matrix and can be slow to respond when graphics are displayed. Also called super-twist nematic (STN).

Path—The route DOS follows to search for a program or batch file when it's not found in the current directory.

RAM—Random-Access Memory. The temporary memory storage area used to load program instructions and store files currently in use. Unless a file is permanently stored on a hard disk, diskette, or other storage medium, changes to information stored in RAM will be lost because RAM is cleared when a computer is turned off.

Refresh Rate—How fast the computer renews the screen, which is about 50 to 75 times a second.

Resolution—A measurement, usually in dots per inch, of the sharpness of an image generated by a monitor or a printer. Higher resolutions yield clearer images; lower resolutions make images appear coarse and out of focus.

Repeat Rate—The speed at which a key repeats when you press and hold it down.

SVGA—Super Video Graphics Array. A high-resolution display standard for IBM-compatible PCs that displays 1,024 pixels horizontally by 768 pixels vertically.

Tracking Speed—The rate at which your mouse pointer travels across your computer screen.

VGA—Video Graphics Array. A popular display standard for IBM-compatible PCs that displays 640 pixels horizontally by 480 pixels vertically.

Wildcard—A character that can be substituted for one or more other characters in a file name. The question mark (?) can be substituted for any one character, and the asterisk (*) can be substituted for a string of characters. This lets you target a DOS command to a set of file names instead of just one—for example, to specify all files ending in ".txt", you would type *.txt.

Write Cache—Also called delayed writes. Write caches are temporary storage areas in which data is held before it's written permanently to a computer's hard drive.

800 Reader Service

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Letters To The Editor

Dear PC Novice:

As an information systems professional, I must praise your staff for putting out a terrific computing magazine, which is helpful for users of all levels. However, I do have one complaint in your selection of articles.

In your most recent issue (July '95), there is an article titled "Virtual Whoopee Cushions," which shows users how to play practical jokes by way of computers in the office. Many of the "tricks" suggested can be quite damaging and a tremendous waste of time for the systems administrators.

The entire article is highly irresponsible and holds absolutely no regard for fellow workers, users, and systems personnel.

I do enjoy your magazine and get much out of it. However, this article has greatly disappointed myself and many of the users here.

Neil G. Parikh, Dir. of Development
Computing Services
Milton Academy
Milton, Mass.

Dear PC Novice:

Having touted your magazine to my computer friends for your constructive and helpful articles in the past, I was very disappointed to read "Virtual Whoopee Cushions." The dirty tricks you described are not only adolescent, but downright malicious, and have no place in a publication supposedly dedicated to helping the computer novice.

Jack Huntington
New Hartford, NY

Ed: We received several letters voicing everything from concern to outrage that we would publish a how-to article on computer pranks. While we left out the truly harmful tricks we discovered, we understand that the pranks we did describe can be a distracting, and potentially costly, annoyance in professional settings.

It's obvious our readers want clear instructions on how to make PCs work better for them, not how to fool around on their machines. Our readers have spoken, and we're listening. PC pranks have made their first, and final, appearance in the pages of PC Novice.

Letters to the Editor should be sent to: *PC Novice* / P.O. Box 85380, Lincoln, NE 68501-5380. Letters may be edited for clarity or space.

FAX FEEDBACK

PC NOVICE® Presents...

Topic of the month . . . Buying PC Products

This is the second edition of our monthly fax feedback section. The topic of this month's survey is "Buying PC Products." In upcoming issues, we will try to make the buying process easier for you, and we need your help to do this! So, let us know what your needs and frustrations are, and we will do our best to provide you with the information you need to make an educated decision.

To show our appreciation for your comments, we will randomly select one Fax Feedback participant to receive a *PC Novice* T-shirt.

Coming Attractions . . .

Next month, look for the results from the July Fax Feedback on E-mail. Find out how others are using E-mail and how it can help you!

If you do not have access to a fax machine or would prefer to mail your response, please address your comments to:

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	Have Purchased	Plan To Purchase	Haven't & Don't Plan To Purchase
Hardware	☐	☐	☐
Software	☐	☐	☐
Accessories	☐	☐	☐

2. When you shop at retail, how many different retailers do you, on average, visit before making your final purchase decision on:

	1	2-3	4-6	7-9	10+	Don't Purchase At Retail
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Software	☐	☐	☐	☐	☐	☐
Accessories	☐	☐	☐	☐	☐	☐

3. Did you purchase a PC in the last 12 months, or do you plan to in the next 12 months? (Check all that apply.)
   - ☐ Purchased a PC in the last 12 months
   - ☐ Plan to purchase a PC in the next 12 months
   - ☐ Didn't purchase a PC in the last 12 months and don't plan to in the next 12 months *(Go to question 7.)*

4. What features do you/did you look for when buying a PC?
   - ☐ Ease of use
   - ☐ Bundled software
   - ☐ Multimedia/CD-ROM
   - ☐ Price
   - ☐ Upgradability
   - ☐ Other _____

5. Of those you marked in #4, please circle the feature that is/was most important to you.

6. What do you/did you fear most when when buying a PC?
   - ☐ Difficult to use
   - ☐ Outdated technology
   - ☐ Haggling with salespeople
   - ☐ Being able to set it up
   - ☐ Other

7. How many software titles do you own?
   - ☐ 5 or less
   - ☐ 6 to 10
   - ☐ 11 to 15
   - ☐ 16 to 20
   - ☐ 21 to 25
   - ☐ 26 or more

We look forward to hearing from you. Thanks for your time!

Name and address:
This is optional, but necessary to be included in the drawing.

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Editorial

COMMENT

Microsoft is under fire, again.

Recently, the software giant had to back off from its proposed $1.5 billion acquisition of Intuit. The Department of Justice decided that the merger would be bad for consumers because it would give Microsoft too dominant a position in certain software markets. Rather than fight a prolonged court battle with Uncle Sam, Microsoft reluctantly retreated.

We don't need more protection from Microsoft. Let it continue to set standards and reap the rewards . . .

Now the government is looking into the Microsoft Network, a new online service that will be launched with the release of the Windows 95 operating system. The anticipated success of Windows 95 would ensure that millions of users could quickly gain access to the new network. Other online services are crying foul, claiming that by combining its operating system with its online service, Microsoft will have an unfair advantage. These companies want the government to force Microsoft to remove its Network from Windows 95.

Lurking in the background is the possibility the government may launch an effort to actually break up Microsoft, in order to separate the software applications, online service, and operating systems divisions.

That would be a big mistake. We think the government should leave Microsoft alone at least for now.

In order for technical advances to be incorporated in viable products for consumers, there have to be widespread standards. You can't have every company offering products based on proprietary technology. This is especially important when it comes to personal computers, where one consumer may need to use products from a dozen different companies software as well as hardware on a single computer system. Add in the complexities of networks, and the need for standardization increases exponentially.

One of the holy grails in the personal computer industry is universal access: the ability to tie into a network that everyone else is also tied into, from anywhere, at anytime. Imagine using such a network to pay bills, invoice clients, send E-mail or voice-mail messages, download homework assignments, make reservations at restaurants, check cinema listings, etc.

Laying the groundwork for such a network is a mammoth task. You need a critical mass of customers for it to have a chance of succeeding. You must have standards set that let companies perform online financial transactions. You've got to have enough capital to launch it properly and sustain it until it grows enough to survive on its own.

For some time now, Microsoft has been putting together the pieces that would allow it to launch such a network. If it succeeds, this new venture has the potential to dwarf its previous business successes.

Want critical mass? More than 60 million people currently use Windows. Imagine that many or more using Windows 95. By combining its Network with its operating system, Microsoft quickly gains access to a huge audience three times the number of people that currently use the Internet.

Acquiring Intuit would have given Microsoft access to millions of people who are ready right now for online financial transactions. Unfortunately, government intervention has already blocked that avenue. Microsoft will have to rebuild that piece of the puzzle on its own.

If the government steps in again and forces Microsoft to remove its Network from Windows 95, or goes even further and forces the company to separate into different entities, it's consumers who will suffer. Breaking up Microsoft at this point would be like breaking up AT&T before telephone lines were stretched around the country.

We don't need more protection from Microsoft. Let the company establish its network to help push penetration of online computer technology into more homes and businesses. Let it continue to set standards and reap the rewards for its investment.

By providing universal standards, Microsoft opens the door for other manufacturers to reach a marketplace that is large enough to sustain them. The company has helped push technological development, and its efforts help new consumers join the world of personal computing everyday.

If, at some time in the future, Microsoft abuses its position of dominance in the computer marketplace and truly hurts consumers, then let the government take action. Right now, prices for software continue to drop, and yet the programs keep improving. That hardly seems like a clarion call for intervention.

By combining its Network with Windows 95, Microsoft is clearing the way for an online road that may lead to universal online access and online financial transactions.

We say, let 'em build it. ●

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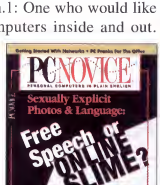

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